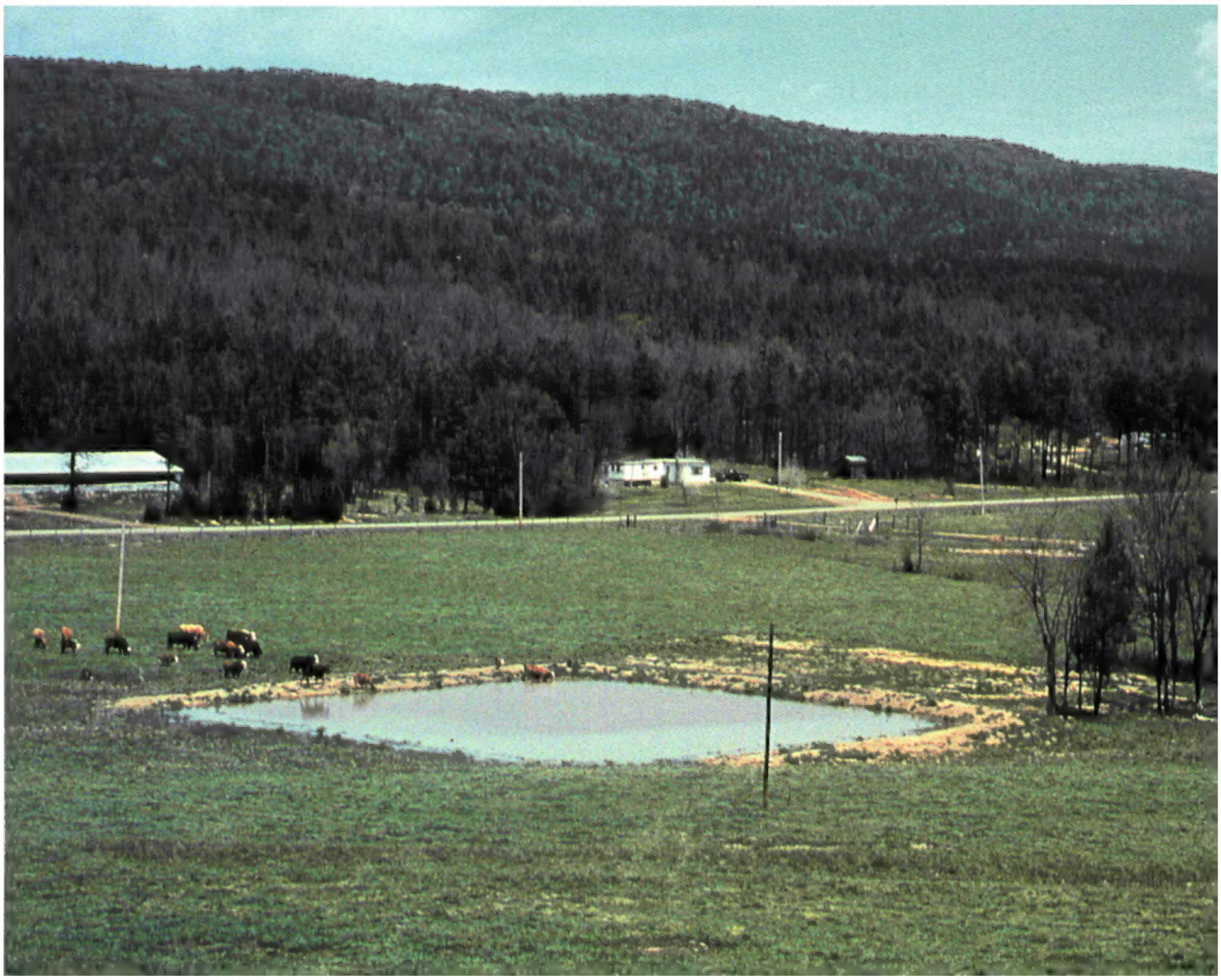
USDA United States Department of Agriculture

Natural Resources Conservation Service

In cooperation with United States Department of Agriculture, Forest Service; and the Arkansas Agricultural Experiment Station

Soil Survey of Scott County, Arkansas



How To Use This Soil Survey

General Soil Map

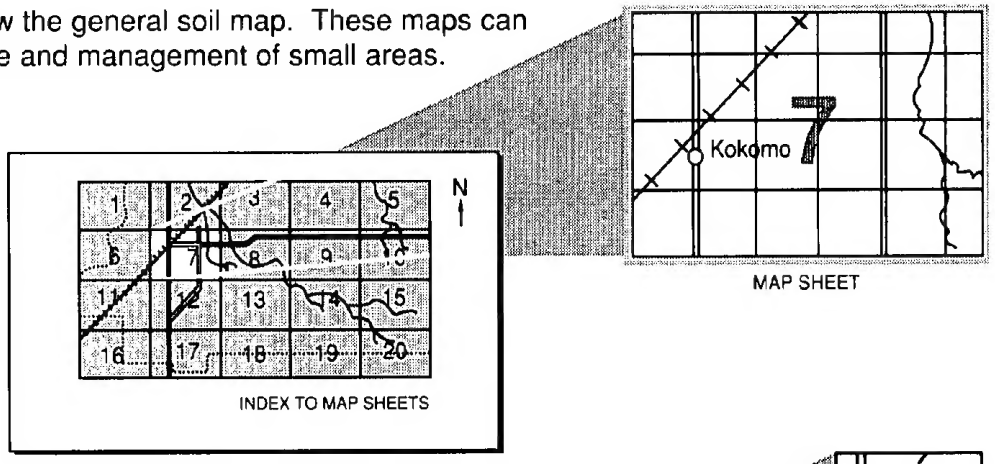
The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

Detailed Soil Maps

The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.

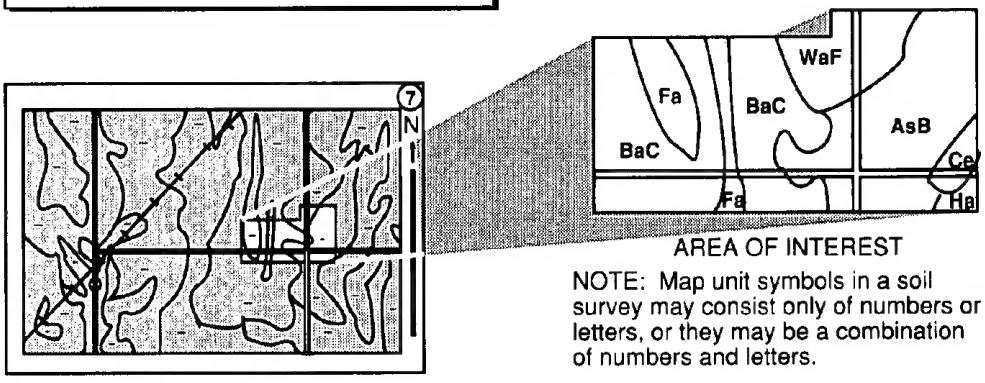
To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.



INDEX TO MAP SHEETS

MAP SHEET

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** (see Contents), which lists the map units by symbol and name and shows the page where each map unit is described.



MAP SHEET

AREA OF INTEREST

NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (formerly the Soil Conservation Service) has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1987. Soil names and descriptions were approved in 1993. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1987. This soil survey was made cooperatively by the Natural Resources Conservation Service, the U.S. Forest Service, and the Arkansas Agricultural Experiment Station. It is part of the technical assistance furnished to the Poteau River Conservation District.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

All programs and services of the Natural Resources Conservation Service are offered on a nondiscriminatory basis, without regard to race, color, national origin, religion, sex, age, marital status, or handicap.

Cover: A pasture in an area of Leadvale silt loam, 3 to 8 percent slopes. Cattle, poultry, and timber production represent the dominant agriculture income for residents in Scott County.

Contents

Summary of Tables

Foreword

This soil survey contains information that can be used in land-planning programs in Scott County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, ranchers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

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Soil Survey of
Scott County, Arkansas

By Frank M. Vodrazka, Natural Resources Conservation Service

Fieldwork by Billy A. Garner, Jeffrey W. Olson, Ronald K. Rhodes, and
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United States Department of Agriculture, Natural Resources Conservation Service,
in cooperation with
United States Department of Agriculture, Forest Service; and
the Arkansas Agricultural Experiment Station

Scott County is in the western part of Arkansas (fig. 1). It is rectangular in shape and ranges from about 28 miles from north to south and from about 42 miles from east to west. The county is bordered on the north by Logan and Sebastian Counties, on the east by Yell County, on the south by Polk and Montgomery Counties, and on the west by LeFlore County, Oklahoma. The total area is 575,027 acres, or 898 square miles, which includes 1,280 acres of large bodies of water.

In 1990, the population of Scott County was 10,205. Waldron, the county seat, nad a population of 3,026. Most of the people in the county, including more than half of the farmers, work in industries or supporting businesses in Waldron, Mansfield, and Fort Smith.

The economy of the county is based on livestock and poultry production, timber production, industry, and business (fig. 2).

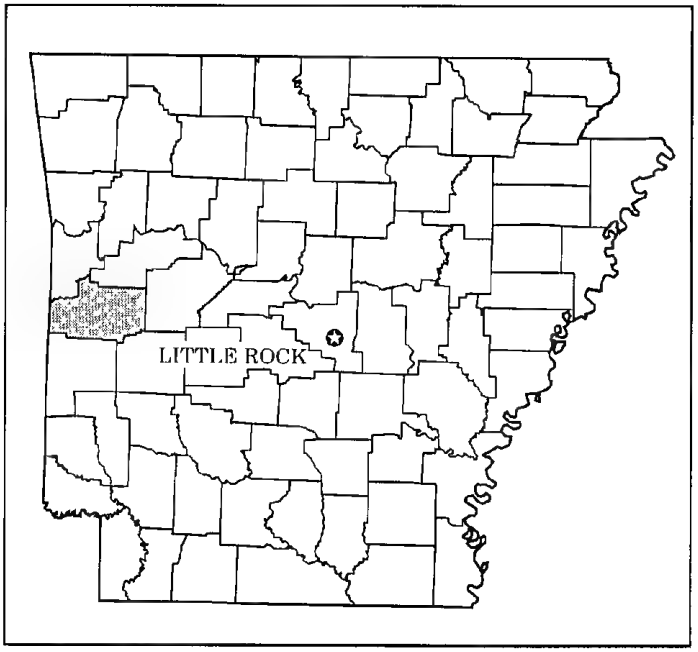

Figure 1.—Location of Scott County in Arkansas.

General Nature of the County

This section describes briefly the history and development, farming, physiography and drainage, and climate in Scott County.

About 70 percent of the county is mountainous and hilly. These areas are scattered through the county, and the elevation ranges from about 500 feet at the base of hills and mountains to 2,669 feet at the top of Poteau Mountain in the northwestern part of the county. The soils in most of these areas are too steep for intensive use. The soils are used mainly for woodland and for native pasture. Some of the less sloping soils are suitable for improved pasture, and some of the soils in narrow valleys are suitable for truck crops.

About 30 percent of the county is level to gently sloping hilltops and mountaintops, valley fill, and alluvial sediments. The elevation ranges from about 455 feet in the eastern part of the county to about 655 feet atop the valley ridges. The soils in the level to gently sloping areas are used mainly for forage crops.

Figure 2.—Cattle, poultry, and timber production represent the dominant agriculture income for residents in the survey area. Foreground—Carnasaw-Sherless complex, 3 to 8 percent slopes; Middleground—Leadvale silt loam, 1 to 3 percent slopes; Background—Carnasaw-Sherless complex, 20 to 35 percent slopes.

History and Development

According to historical data, Hernando DeSoto was the first white man to trek across Scott County around 1542.

Archeological remains indicate that Indians were quite numerous along the Fourche La Fave River and Petit Jean Creek. Several burial grounds have been located in the Parks and Boles communities.

The first white settlers appeared on Petit Jean Creek in about 1830. Later, on November 5, 1833, Scott County was formed; and, subsequently, the town of Waldron was established. The population grew and the town prospered until the time of the Civil War. During the war, every building in Waldron was burned to the ground. Rebuilding was hard work, and even after the war, outlaws and thieves plundered and killed, making it an even more difficult and slow process.

During the 1940's, coal mining and lumbering caused the Scott County population to rise to an all-time high of 13,300. In 1964, the population was approximately 7,500, according to the Bureau of the Census, a drop in population of nearly 50 percent in a quarter century. However, that trend has reversed to a slow and steady increase to the current population of over 10,000.

Farming

The early settlers of Scott County came from eastern

and southern states. When they first arrived in the 1830's, they found the ridges covered with pine, and in the valleys, hardwood predominated. Gradually, over the years, these early farmers cleared the land and farmed the soils in the valleys on the uplands that had good natural drainage and that were above the flood plains of the Poteau and Fourche La Fave Rivers and their tributaries. These settlers were subsistence farmers, but they soon started to grow cotton as a cash crop. Cotton became a big cash crop with several cotton gins scattered over the county, but today the total cotton acreage is very small. Corn was also grown but was mainly used on the farm. It was ground into corn meal and the rest was used to feed work stock and other livestock. The steep, stony, or wet areas were left in woodland.

The trend of intensive farming, limited nutrient replenishment, and erosion control continued until about 1930. Finally, the soils productivity decreased to the extent that many farmers were forced to abandon their farms or change from cultivated crops to pasture or meadow in the 1930's through the 1950's. It was also during this period that Scott County landowners recognized the need to protect their soils and water resources. Therefore, in 1938, they formed the Poteau River Soil and Water Conservation District, which was one of the first conservation districts established in the United States.

According to the 1995 Census of Agriculture, about 20 percent of Scott County was in farms. There were 612 farms, and the average size was 188 acres. The rest of the land is taken up by cities, towns, rural subdivisions, state-owned land, federal-owned land, land owned by large timber companies, and transportation and utility facilities.

Most farm income is from livestock, mainly beef cattle and broiler chicken production. At the present time, Scott County is part of a major poultry-producing area. Raising broiler chickens is the main enterprise, but egg production is also important. Poultry litter and manure is a valuable by-product of the poultry industry. Most of it is spread on pasture and hayland in the county each year.

Beef cattle production has increased in recent years. Most farms have a cow-calf operation and sell the calves as feeders or stockers. In general, beef cattle are grazed on cool- and warm-season pasture and ordinarily are given supplemental feeding only in winter.

According to the 1995 Agricultural Statistics for Arkansas, the number and principal kinds of livestock and the yearly production of broiler chickens in Scott County were as follows:

Cattle and calves	*26,000*
Milk cows	*400*
Hogs and pigs	*500*
Chickens, broilers	*34,927,000*

Most farms are small enough for the family to do most of the work. Outside labor may be hired during peak seasons. The larger farms are operated by laborers who are supervised by the owner or manager.

Physiography and Drainage

Topographically, Scott County can be divided into two main regions or land resource areas—the level to steeply sloping Arkansas Valley and Ridges and the level to steep Ouachita Mountains.

The topography in the Arkansas Valley and Ridges ranges from level to nearly level flood plains along local streams, level to rolling flat-topped hills, long narrow ridges and broad valleys, and rolling to very steep hillsides and mountainsides. The main soils on the flood plains are Neff, Spadra, and Cupco. Cane, Leadvale, Sallisaw, and Taft soils dominate the broad valleys. Enders, Endsaw, Linker, Nella, and Mountainburg soils dominate the ridges. This area is drained by streams that include Dutch Creek, Sugar Creek, Square Rock Creek, Petit Jean River, and Poteau River.

The topography in the Ouachita Mountains ranges from level to nearly level flood plains along local streams, nearly level to gently sloping valleys, and gently sloping to very steep hillsides and mountainsides. The main soils on the flood plains are Ceda, Cupco, Kenn, Neff, and Spadra. Avilla, Cane, Leadvale, Sallisaw, and Taft soils dominate the valleys. Carnasaw, Octavia, Sherless, and Clebit soils dominate the hillsides and mountainsides. This area is drained by streams that include Dutch Creek, Jones Creek, Mill Creek, Fourche La Fave River, and Black Fork of the Poteau River.

Most of the tributary streams in the uplands are intermittent, but some flow the year round. Livestock water is obtained from the creeks and from the wells and ponds. Domestic water supplies are from dug or drilled wells.

Climate

Table 1 gives data on temperature and precipitation for the survey area as recorded at Waldron in the period 1951 to 1984 and 1961 to 1990, respectively. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 42 degrees F and the average daily minimum temperature is 29 degrees. The lowest temperature on record, which occurred at Waldron on February 2, 1951, is -20 degrees. In summer, the average temperature is 80 degrees and the average daily maximum temperature is 93 degrees. The highest recorded temperature, which occurred on July 17, 1980, is 111 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

Of the total annual precipitation, 26 inches, or 55 percent, usually falls in April through September. The growing season for most crops falls within this period. In 3 years out of 10, the rainfall in April through September is less than 17 inches. The heaviest 1-day rainfall during the period of record was 6.52 inches at Waldron on December 3, 1982. Thunderstorms occur on about 57 days each year, and most occur in summer.

The average seasonal snowfall is about 7 inches. The greatest snow depth at any one time during the period of record was 11 inches. On the average, 2 days have at least 1 inch of snow on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 55 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The sun shines 70 percent of the time possible in summer and 50 percent in winter. The prevailing wind is from the southwest. Average windspeed is highest, 10 miles per hour, in spring.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material from which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area are generally collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they

cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by two or three kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. In the detailed soil map units, these latter soils are called inclusions or included soils. In the general soil map units, they are called soils of minor extent.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soils on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, it consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or a building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

Soil Descriptions

1. Leadvale-Endsaw-Taft

Very deep and deep, moderately well drained, well drained, and somewhat poorly drained, level to steep soils on uplands

Setting

Location in the survey area: Mainly in the central and northern parts
Landscape: Uplands
Landform: Leadvale—broad upland valleys; Endsaw—ridges; Taft—broad upland valleys
Landform position: Leadvale—footslopes and valley floors; Endsaw—sideslopes and footslopes; Taft—valley floors
Slope range: 0 to 35 percent

Composition

Percent of the survey area: 18
Leadvale soils—55 percent
Endsaw soils—13 percent
Taft soils—12 percent
Minor soils—20 percent

Minor soils

- Cane
- Linker
- Mountainburg
- Sallisaw

Land Use

Major Uses: Pasture, hayland, and woodland

2. Enders-Nella-Mountainburg

Very deep, deep, and shallow, well drained, gently sloping to very steep, gravelly, cobbly, stony, and loamy soils on uplands

Setting

Location in the survey area: Northern one-third
Landscape: Uplands
Landform: Ridges and mountains
Landform position: Enders—sideslopes and footslopes; Nella—benches, sideslopes, and footslopes; Mountainburg—ridgetops, mountaintops, and sideslopes
Slope range: 3 to 60 percent

Composition

Percent of the survey area: 21
Enders soils—40 percent
Nella soils—22 percent
Mountainburg soils—15 percent
Minor soils—23 percent

Minor soils

- Ceda
- Kenn

- Leadvale
- Linker
- Sallisaw
- Small areas of rock outcrop

Land Use

Major Uses: Woodland and pasture

3. Spadra-Neff-Cupco

Very deep, well drained, moderately well drained, and somewhat poorly drained, loamy soils on upland drainageways

Setting

Location in the survey area: Scattered throughout the county
Landscape: Uplands
Landform: Drainageways
Landform position: Flood plains and low stream terraces
Slope range: 0 to 3 percent

Composition

Percent of the survey area: 4
Spadra soils—50 percent
Neff soils—18 percent
Cupco soils—12 percent
Minor soils—20 percent

Minor soils

- Kenn
- Leadvale
- Rexor
- Sallisaw

Land Use

Major Uses: Pasture and hayland

4. Carnasaw-Sherless-Clebit

Deep, moderately deep, and shallow, well drained, gently sloping to very steep, gravelly, cobbly, stony, very stony, and loamy soils on uplands

Setting

Location in the survey area: Central and southern parts
Landscape: Uplands
Landform: Mountains and ridges
Landform position: Ridgetops, mountaintops, and sideslopes
Slope range: 3 to 60 percent

Composition

Percent of the survey area: 53
Carnasaw soils—61 percent
Sherless soils—19 percent
Clebit soils—4 percent
Minor soils—16 percent

Minor soils

- Avilla
- Caston
- Ceda
- Kenn
- Octavia
- Wilburton
- Small areas of rock outcrop

Land Use

Major Uses: Woodland and pasture

5. Kenn-Avilla-Ceda

Very deep, well drained, level to gently sloping, gravelly, cobbly, and loamy soils on upland drainageways

Setting

Location in the survey area: Southern part
Landscape: Uplands
Landform: Drainageways
Landform position: Kenn—flood plains; Avilla—stream terraces; Ceda—flood plains
Slope range: 0 to 8 percent

Composition

Percent of the survey area: 3
Kenn soils—45 percent
Avilla soils—25 percent
Ceda soils—25 percent
Minor soils—5 percent

Minor soils

- Carnasaw
- Sallisaw
- Sherless
- Wilburton

Land Use

Major Uses: Pasture and woodland

6. Octavia-Caston-Carnasaw

Very deep and deep, well drained, gently sloping to very steep, gravelly, cobbly, stony, very stony, and loamy soils on uplands

Setting

Location in the survey area: Southern part
Landscape: Uplands
Landform: Mountains and ridges
Landform position: Ridgetops, mountaintops, and sideslopes
Slope range: 3 to 60 percent

Composition

Percent of the survey area: 1
Octavia soils—50 percent
Caston soils—25 percent
Carnasaw soils—15 percent
Minor soils—10 percent

Minor soils

- Avilla
- Ceda
- Clebit
- Kenn
- Sherless
- Wilburton
- Small areas of rock outcrop

Use and Management

Major Uses: Pasture and woodland

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under the heading "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Enders gravelly silt loam, 3 to 8 percent slopes, is a phase of the Enders series.

Some map units are made up of two or more major soils. These map units are called soil complexes.

A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Carnasaw-Sherless-Clebit complex, 3 to 8 percent slopes, is an example.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

Soil Descriptions

AvB—Avilla silt loam, 1 to 3 percent slopes

Setting

Landform position: Stream terraces of upland drainageways
Size of areas: 10 to 300 acres

Typical Profile

Surface layer:
0 to 6 inches—brown silt loam

Subsoil:
6 to 12 inches—strong brown loam
12 to 61 inches—yellowish red clay loam
61 to 72 inches—yellowish red gravelly loam

Inclusions

- Ceda soils
- Kenn soils
- Small areas with gravelly or cobbly surface layers
- Small areas that are subject to rare flooding

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: High
Depth to seasonal high water table: >72 inches
Shrink-swell potential: Low
Hazard of flooding: None
Surface runoff: Low - medium
Soil reaction: Strongly acid or very strongly acid
Parent material: Loamy alluvium

Land Use

Major Uses: Pasture and hayland

Cropland

Land capability subclass: IIe
Suitability: Well suited
Adapted crops: Soybeans, truck crops, grain sorghum, and winter small grains
Management concerns:
- Moderate erosion hazard

Management measures:
- Minimum tillage
- Contour cultivation
- Terracing on long slopes

Pasture and hayland

Suitability: Well suited
Adapted plants: Bahiagrass, bermudagrass, and tall fescue
Management concerns:
- No significant limitations

Woodland

Woodland suitability group: 8A7
Suitability: Moderately suited
Adapted species: Loblolly pine, shortleaf pine, and southern red oak
Management concerns:
- No significant limitations

Management measures:
- See Woodland Management and Productivity Section (Pages 68-71)

Urban Uses

Dwellings

Limitation rating: Slight
Limitations:
- No significant limitations

Small Commercial Buildings

Limitation rating: Slight
Limitations:
- No significant limitations

Septic Tank Absorption Fields

Limitation rating: Moderate
Limitations:
- Moderate permeability

Corrective measures:
- Increase size of absorption field

Local Roads and Streets

Limitation rating: Slight
Limitations:
- No significant limitations

AvC—Avilla silt loam, 3 to 8 percent slopes

Setting

Landform position: Stream terraces of upland drainageways
Size of areas: 10 to 300 acres

Typical Profile

Surface layer:
0 to 6 inches—brown silt loam

Subsoil:
6 to 12 inches—strong brown loam
12 to 61 inches—yellowish red clay loam
61 to 72 inches—yellowish red gravelly loam

Inclusions

- Ceda soils
- Kenn soils
- Leadvale soils
- Wilburton soils
- Small areas with gravelly or cobbly surface layers
- Small areas that are subject to rare flooding

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: High
Depth to seasonal high water table: >72 inches
Shrink-swell potential: Low
Hazard of flooding: None
Surface runoff: Medium
Soil reaction: Strongly acid or very strongly acid
Parent material: Loamy alluvium

Land Use

Major Uses: Pasture

Cropland

Land capability subclass: IIIe
Suitability: Moderately suited
Adapted crops: Grain sorghum, winter small grains, and soybeans
Management concerns:
- Severe erosion hazard

Management measures:
- Minimum tillage
- Contour cultivation
- Terraces
- Measures need to be intensified as slope increases

Pasture

Suitability: Well suited
Adapted plants: Bahiagrass, bermudagrass, and tall fescue
Management concerns:
- No significant limitations

Woodland

Woodland suitability group: 8A7
Suitability: Moderately suited
Adapted species: Loblolly pine, shortleaf pine, and southern red oak
Management concerns:
- No significant limitations

Management measures:
- See Woodland Management and Productivity Section (Pages 68-71)

Urban Uses

Dwellings

Limitation rating: Slight
Limitations:
- No significant limitations

Small Commercial Buildings

Limitation rating: Moderate
Limitations:
- Slope

Corrective measures:
- Design to conform to the natural contour

Septic Tank Absorption Fields

Limitation rating: Moderate
Limitations:
- Moderate permeability

Corrective measures:
- Increase size of absorption field
- Special design or alternate system

Local Roads and Streets

Limitation rating: Slight
Limitations:
- No significant limitations

CaC—Cane fine sandy loam, 3 to 8 percent slopes (fig. 3)

Setting

Landform position: Broad upland valleys
Size of areas: 5 to 50 acres

Typical Profile

Surface layer:
0 to 5 inches—brown fine sandy loam

Subsoil:
5 to 20 inches—yellowish red clay loam
20 to 28 inches—strong brown, mottled, compact, and brittle clay loam
28 to 48 inches—mottled strong brown and gray, compact, and brittle clay loam
48 to 64 inches—mottled strong brown and gray silty clay loam

Bedrock:
64 to 72 inches—partially weathered, soft, acid shale

Inclusions

- Enders soils
- Leadvale soils
- Sallisaw soils

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderate above the fragipan and slow in the fragipan
Available water capacity: Moderate
Depth to seasonal high water table: 1.5 to 2.5 feet
Shrink-swell potential: Low
Hazard of flooding: None
Surface runoff: Medium
Soil reaction: Moderately acid to strongly acid in the surface layer and strongly acid to very strongly acid in the subsoil
Parent material: Valley fill derived from sandstone and shale
Other distinctive properties: Depth to fragipan ranges from 20 to 35 inches

Land Use

Major Uses: Pasture and hayland

Cropland

Land capability subclass: IIIe
Suitability: Moderately suited
Adapted crops: Soybeans, truck crops, corn, and small grains
Management concerns:
- Severe erosion hazard

Management measures:
- Conservation tillage
- Contour cultivation
- Terracing on long slopes
- Measures need to be intensified as slope increases

Pasture and hayland

Suitability: Well suited
Adapted plants: Bermudagrass, bahiagrass, and tall fescue
Management concerns:
- No significant limitations

Woodland

Woodland suitability group: 8D8
Suitability: Moderately suited
Adapted species: Shortleaf and loblolly pine
Management concerns:
- Moderate windthrow hazard

Management measures:
- See Woodland Management and Productivity Section (Pages 68-71)

Urban Uses

Dwellings

Limitation rating: Moderate
Limitations:
- Wetness

Corrective measures:
- Shaping of site
- Tile drains by footings
- Selective placement on site

Small Commercial Buildings

Limitation rating: Moderate
Limitations:
- Wetness
- Slope

Figure 3.—An area of Cane fine sandy loam, 3 to 8 percent slopes, *where* poultry litter has enhanced the productivity of the soil.

Corrective measures:
- Shaping of site
- Tile drains by footings
- Selective placement on site
- Special design to conform to the natural slope

Septic Tank Absorption Fields

Limitation rating: Severe
Limitations:
- Wetness
- Slow permeability

Corrective measures:
- Drainage system around filter field
- Enlargement of f lter field area
- Special design or alternate system

Local Roads and Streets

Limitation rating: Moderate
Limitations:
- Wetness

Corrective measures:
- Construction on a raised fill of suitable subgrade material
- Installation of drainage system

CbD—Carnasaw stony silt loam, 3 to 15 percent slopes

Setting

Landform position: Mountaintops
Size of areas: 20 to 200 acres

Typical Profile

Surface layer:
0 to 4 inches—very dark grayish brown stony silt loam

Subsurface layer:
4 to 11 inches—yellowish brown cobbly silt loam

Subsoil:
11 to 27 inches—yellowish red clay
27 to 40 inches—red, mottled clay
40 to 50 inches—mottled red and gray channery clay
50 to 58 inches—mottled strong brown and gray channery silty clay

Bedrock:
58 to 72 inches—fractured and tilted, soft shale with lenses of sandstone

Inclusions

- Clebit soils
- Sherless soils

Soil Properties and Qualities

Depth class: Deep
Drainage class: Well drained
Permeability: Slow
Available water capacity: Moderate
Depth to seasonal high water table: >60 inches
Shrink-swell potential: High
Hazard of flooding: None
Surface runoff: High
Soil reaction: Moderately acid or strongly acid in the surface and subsurface layer and strongly acid or very strongly acid in the subsoil
Parent material: Clayey residuum from shale

Land Use

Major Uses: Woodland

Cropland

Land capability subclass: VIs
Suitability: Not suited
Management concerns:
- Very severe erosion hazard
- Slope
- Surface stones

Pasture

Suitability: Poorly suited
Adapted plants: Bermudagrass, bahiagrass, tall fescue, white clover, and lespedeza
Management concerns:
- Erosion hazard
- Surface stones
- Low fertility levels

Management measures:
- Proper stocking rates
- Rotation grazing
- Maintaining fertility levels
- Weed and brush control

Woodland

Woodland suitability group: 7X8
Suitability: Moderately suited
Adapted species: Loblolly pine, shortleaf pine, and southern red oak
Management concerns:
- Moderate equipment use limitation

Management measures:
- See Woodland Management and Productivity Section (Pages 68-71)

Urban Uses

Dwellings

Limitation rating: Severe

Limitations:
- High shrink-swell potential

Corrective measures:
- Extra reinforcement in foundations
- Backfill with sandy material

Small Commercial Buildings

Limitation rating: Severe
Limitations:
- High shrink-swell potential
- Slope

Corrective measures:
- Extra reinforcement in foundations
- Backfill with sandy material
- Special design to conform to the natural slope

Septic Tank Absorption Fields

Limitation rating: Severe
Limitations:
- Slow permeability

Corrective measures:
- Special design or alternate system

Local Roads and Streets

Limitation rating: Severe
Limitations:
- High shrink-swell potential
- Low strength

Corrective measures:
- Construction on suitable subgrade or base material

CCF—Carnasaw-Octavia complex, 15 to 35 percent slopes

Setting

Landform position: South-facing sideslopes and benches of the Ouachita Mountains. Carnasaw soils are mostly on slopes between the benches, and Octavia soils occupy the benches and lower sideslopes.
Size of areas: 40 to 800 acres

Composition

Carnasaw and similar soils: 60 percent
Octavia and similar soils: 30 percent
Minor soils: 10 percent

Typical Profile

Carnasaw

Surface layer:
0 to 4 inches—very dark grayish brown stony silt loam

Subsurface layer:
4 to 11 inches—yellowish brown cobbly silt loam

Subsoil:
11 to 27 inches—yellowish red clay
27 to 40 inches—red, mottled clay
40 to 50 inches—mottled red and gray channery clay
50 to 58 inches—mottled strong brown and gray channery silty clay

Bedrock:
58 to 60 inches—fractured and tilted, soft shale with lenses of sandstone

Octavia

Surface layer:
0 to 4 inches—dark grayish brown stony loam

Subsurface layer:
4 to 8 inches—yellowish brown cobbly loam

Subsoil:
8 to 13 inches—strong brown loam
13 to 41 inches—yellowish red clay loam
41 to 72 inches—mottled yellowish red, red, and gray clay

Soil Properties and Qualities

Depth class: Carnasaw—deep; Octavia—very deep
Drainage class: Well drained
Permeability: Carnasaw—slow; Octavia—moderately slow
Available water capacity: Moderate
Depth to seasonal high water table: >60 inches
Shrink-swell potential: Carnasaw—high; Octavia—low
Hazard of flooding: None
Surface runoff: High - very high
Soil reaction: Moderately acid or strongly acid in the surface and subsurface layers and strongly or very strongly acid in the subsoil
Parent material: Carnasaw—clayey residuum from shale; Octavia—loamy colluvium over clayey residuum
Depth to bedrock: Carnasaw—40 to 60 inches; Octavia—>60 inches

Inclusions

- Clebit soils
- Sherless soils
- Small areas with gravelly or cobbly surface layers

Land Use

Major Uses: Woodland

Cropland

Land capability subclass: VIIs
Suitability: Not suited
Management concerns:
- Surface stones
- Steep slopes
- Very severe erosion hazard

Pasture and hayland

Suitability: Poorly suited to not suited
Adapted plants: Fescue and native grasses
Management concerns:
- Low fertility levels
- Surface stones
- Steep slopes

Management measures:
- Proper stocking rates
- Rotation grazing
- Maintain fertility levels
- Weed and brush control

Woodland

Woodland suitability group: 7R8
Suitability: Moderately suited
Adapted species: Shortleaf pine, loblolly pine, and southern red oak
Management concerns:
- Moderate equipment use limitation
- Moderate erosion hazard

Management measures:
- See Woodland Management and Productivity Section (Pages 68-71)

Urban Uses

Dwellings

Limitation rating: Severe
Limitations:
- Steep slopes
- Carnasaw—high shrink-swell potential

Corrective measures:
- High shrink-swell potential—extra reinforcement in foundations and backfill with sandy material
- Slope—design to conform to the natural contour

Small Commercial Buildings

Limitation rating: Severe
Limitations:
- Steep slopes
- Carnasaw—high shrink-swell potential

Corrective measures:
- High shrink-swell potential—extra reinforcement in foundations and backfill with sandy material
- Slope—design to conform to the natural contour

Septic Tank Absorption Fields

Limitation rating: Severe
Limitations:
- Steep slopes
- Slow and moderately slow permeability

Corrective measures:
- Enlarge size of absorption field
- Special design or alternate system

Local Roads and Streets

Limitation rating: Severe
Limitations:
- Steep slopes
- Carnasaw—high shrink-swell and low strength

Corrective measures:
- High shrink-swell potential—add fill of suitable subgrade material to road bed
- Slope—design to conform to the natural contour

CDC—Carnasaw-Sherless complex, 3 to 8 percent slopes

Setting

Landform position: Lower sideslopes of ridges and mountains
Size of areas: 30 to 300 acres

Composition

Carnasaw and similar soils: 70 percent
Sherless and similar soils: 20 percent
Minor soils: 10 percent

Typical Profile

Carnasaw

Surface layer:
0 to 4 inches—very dark grayish brown gravelly silt loam

Subsurface layer:
4 to 11 inches—yellowish brown cobbly silt loam

Subsoil:
11 to 27 inches—yellowish red clay
27 to 40 inches—red, mottled clay
40 to 50 inches—mottled red and gray channery clay
50 to 58 inches—mottled strong brown and gray channery silty clay

Bedrock:
58 to 60 inches—fractured and tilted, soft shale with lenses of sandstone

Sherless

Surface layer:
0 to 3 inches—dark grayish brown gravelly fine sandy loam

Subsurface layer:
3 to 7 inches—yellowish brown fine sandy loam

Subsoil:
7 to 17 inches—strong brown sandy clay loam
17 to 27 inches—strong brown gravelly sandy clay loam

Bedrock:
27 to 40 inches—tilted, soft, platy sandstone with lenses of shale

Soil Properties and Qualities

Depth class: Carnasaw—deep; Sherless—moderately deep
Drainage class: Well drained
Permeability: Carnasaw—slow; Sherless—moderate
Available water capacity: Carnasaw—moderate; Sherless—low
Depth to seasonal high water table: >60 inches
Shrink-swell potential: Carnasaw—high; Sherless—low
Hazard of flooding: None
Surface runoff: Medium - high
Soil reaction: Moderately acid or strongly acid in the surface and subsurface layers and strongly or very strongly acid in the subsoil
Parent material: Carnasaw—clayey residuum from shale; Sherless—loamy residuum from sandstone and shale
Depth to bedrock: Carnasaw—40 to 60 inches; Sherless—20 to 40 inches

Inclusions

- Ceda soils
- Clebit soils
- Kenn soils
- Small areas with cobbly or stony surface layers

Land Use

Major Uses: Woodland

Cropland

Land capability subclass: IVe
Suitability: Poorly suited
Adapted crops: Winter small grains
Management concerns:
- Very severe erosion hazard

Management measures:
- Contour farming
- Minimum tillage
- Terracing
- Crop residue management

Pasture and hayland

Suitability: Moderately suited
Adapted plants: Bermudagrass, bahiagrass, clover, lespedeza, and tall fescue
Management concerns:
- Low fertility levels

Management measures:
- Proper stocking rates
- Rotation grazing
- Maintain fertility levels
- Weed and brush control

Woodland

Woodland suitability group: 7A7
Suitability: Moderately suited
Adapted species: Shortleaf pine, loblolly pine, and southern red oak
Management concerns:
- No significant limitations

Management measures:
- See Woodland Management and Productivity Section (Pages 68-71)

Urban Uses

Dwellings

Limitation rating: Carnasaw—severe; Sherless—slight
Limitations:
- Carnasaw—high shrink-swell potential
- Sherless—no significant limitations

Corrective measures:
- High shrink-swell potential—extra reinforcement in foundations and backfill with sandy material

Small Commercial Buildings

Limitation rating: Carnasaw—severe; Sherless—moderate
Limitations:
- Carnasaw—high shrink-swell potential
- Sherless—slope

Corrective measures:
- High shrink-swell potential—extra reinforcement in foundations and backfill with sandy material
- Slope—design to conform to the natural contour

Septic Tank Absorption Fields

Limitation rating: Severe
Limitations:
- Carnasaw—slow permeability
- Sherless—depth to bedrock

Corrective measures:
- Special design or alternate system
- Inclusions within map unit which are better suited

Local Roads and Streets

Limitation rating: Carnasaw—severe; Sherless—slight
Limitations:
- Carnasaw—high shrink-swell potential
- Sherless—no significant limitations

Corrective measures:
- Add fill of suitable subgrade material to road bed

CDE—Carnasaw-Sherless complex, 8 to 20 percent slopes

Setting

Landform position: Sideslopes of ridges and mountains
Size of areas: 15 to 500 acres

Composition

Carnasaw and similar soils: 70 percent
Sherless and similar soils: 20 percent
Minor soils: 10 percent

Typical Profile

Carnasaw

Surface layer:
0 to 4 inches—very dark grayish brown cobbly silt loam

Subsurface layer:
4 to 11 inches—yellowish brown cobbly silt loam

Subsoil:
11 to 27 inches—yellowish red clay
27 to 40 inches—red, mottled clay
40 to 50 inches—mottled red and gray channery clay
50 to 58 inches—mottled strong brown and gray channery silty clay

Bedrock:
58 to 60 inches—fractured and tilted, soft shale with lenses of sandstone

Sherless

Surface layer:
0 to 3 inches—dark grayish brown cobbly fine sandy loam

Subsurface layer:
3 to 7 inches—yellowish brown fine sandy loam

Subsoil:
7 to 17 inches—strong brown sandy clay loam
17 to 27 inches—strong brown gravelly sandy clay loam

Bedrock:
27 to 40 inches—tilted, soft, platy sandstone with lenses of shale

Soil Properties and Qualities

Depth class: Carnasaw—deep; Sherless—moderately deep
Drainage class: Well drained
Permeability: Carnasaw—slow; Sherless—moderate
Available water capacity: Carnasaw—moderate; Sherless—low
Depth to seasonal high water table: >60 inches
Shrink-swell potential: Carnasaw—high; Sherless—low
Hazard of flooding: None
Surface runoff: Medium - high
Soil reaction: Moderately acid or strongly acid in the surface and subsurface layers and strongly or very strongly acid in the subsoil
Parent material: Carnasaw—clayey residuum from shale; Sherless—loamy residuum from sandstone and shale
Depth to bedrock: Carnasaw—40 to 60 inches; Sherless—20 to 40 inches

Inclusions

- Ceda soils
- Clebit soils
- Kenn soils
- Octavia soils
- Small areas with gravelly, stony, or very stony surface layers
- Small areas of rock outcrop

Land Use

Major Uses: Woodland

Cropland

Land capability subclass: VIs
Suitability: Not suited
Management concerns:
- Very severe erosion hazard
- Surface cobbles
- Slope

Pasture and hayland

Suitability: Poorly suited
Adapted plants: Bermudagrass, bahiagrass, clover, lespedeza, and tall fescue
Management concerns:
- Low fertility levels
- Surface cobbles
- Slope

Management measures:
- Proper stocking rates
- Rotation grazing
- Maintain fertility levels
- Weed and brush control

Woodland

Woodland suitability group: 7A7
Suitability: Moderately suited
Adapted species: Shortleaf pine, loblolly pine, and southern red oak
Management concerns:
- No significant limitations

Management measures:
- See Woodland Management and Productivity Section (Pages 68-71)

Urban Uses

Dwellings

Limitation rating: Carnasaw—severe; Sherless—moderate
Limitations:
- Carnasaw—high shrink-swell potential
- Sherless—slope

Corrective measures:
- High shrink-swell potential—extra reinforcement in foundations and backfill with sandy material
- Slope—design to conform to the natural contour

Small Commercial Buildings

Limitation rating: Severe
Limitations:
- Carnasaw—high shrink-swell potential and slope
- Sherless—slope

Corrective measures:
- High shrink-swell potential—extra reinforcement in foundations and backfill witn sandy material
- Slope—design to conform to the natural contour

Septic Tank Absorption Fields

Limitation rating: Severe
Limitations:
- Carnasaw—slow permeability
- Sherless—depth to bedrock

Corrective measures:
- Special design or alternate system
- Inclusions within map unit which are better suited

Local Roads and Streets

Limitation rating: Carnasaw—severe; Sherless—moderate
Limitations:
- Carnasaw—high shrink-swell potential
- Sherless—slope

Corrective measures:
- High shrink-swell potential—add fill of suitable subgrade material to road bed
- Slope—design to conform to the natural contour

CDF—Carnasaw-Sherless complex, 20 to 35 percent slopes

Setting

Landform position: Steep sideslopes of ridges and mountains
Size of areas: 40 to 1,000 acres

Composition

Carnasaw and similar soils: 70 percent
Sherless and similar soils: 20 percent
Minor soils: 10 percent

Typical Profile

Carnasaw

Surface layer:
0 to 4 inches—very dark grayish brown stony silt loam

Subsurface layer:
4 to 11 inches—yellowish brown cobbly silt loam

Subsoil:
11 to 27 inches—yellowish red clay
27 to 40 inches—red, mottled clay
40 to 50 inches—mottled red and gray channery clay
50 to 58 inches—mottled strong brown and gray channery silty clay

Bedrock:
58 to 60 inches—fractured and tilted, soft shale with lenses of sandstone

Sherless

Surface layer:
0 to 3 inches—dark grayish brown stony fine sandy loam

Subsurface layer:
3 to 7 inches—yellowish brown fine sandy loam

Subsoil:
7 to 17 inches—strong brown sandy clay loam
17 to 27 inches—strong brown gravelly sandy clay loam

Bedrock:
27 to 40 inches—tilted, soft, platy sandstone with lenses of shale

Soil Properties and Qualities

Depth class: Carnasaw—deep; Sherless—moderately deep
Drainage class: Well drained
Permeability: Carnasaw—slow; Sherless—moderate
Available water capacity: Carnasaw—moderate; Sherless—low
Depth to seasonal high water table: >60 inches
Shrink-swell potential: Carnasaw—high; Sherless—low
Hazard of flooding: None
Surface runoff: High - very high
Soil reaction: Moderately acid or strongly acid in the surface and subsurface layers and strongly acid or very strongly acid in the subsoil
Parent material: Carnasaw—clayey residuum from shale; Sherless—loamy residuum from sandstone and shale
Depth to bedrock: Carnasaw—40 to 60 inches; Sherless—20 to 40 inches

Inclusions

- Ceda soils
- Clebit soils
- Kenn soils

• Small areas with gravelly, cobbly, or very stony surface layers
• Small areas of rock outcrop

Land Use

Major Uses: Woodland

Cropland

Land capability subclass: VIIs
Suitability: Not suited
Management concerns:
• Very severe erosion hazard
• Surface stones
• Steep slopes

Pasture and hayland

Suitability: Poorly suited to not suited
Management concerns:
• Low fertility levels
• Surface stones
• Steep slopes
Adapted plants: Fescue and native grasses
Management measures:
• Proper stocking rates
• Rotation grazing
• Maintain fertility levels
• Weed and brush control

Woodland

Woodland suitability group: 7R8
Suitability: Moderately suited
Adapted species: Shortleaf pine, loblolly pine, and southern red oak
Management concerns:
• Moderate erosion hazard
• Moderate equipment limitations due to slope and surface stones
Management measures:
• See Woodland Management and Productivity Section (Pages 68-71)

Urban Uses

Dwellings

Limitation rating: Severe
Limitations:
• Carnasaw—high shrink-swell potential and slope
• Sherless—slope
Corrective measures:
• High shrink-swell potential—extra reinforcement in foundations and backfill with sandy mater al
• Slope—design to conform to the natural contour

Small Commercial Buildings

Limitation rating: Severe
Limitations:
• Carnasaw—high shrink-swell potential and slope
• Sherless—slope
Corrective measures:
• High shrink-swell potential—extra reinforcement in foundations and backfill with sandy material
• Slope—design to conform to the natural contour

Septic Tank Absorption Fields

Limitation rating: Severe
Limitations:
• Carnasaw—slow permeability
• Sherless—depth to bedrock
Corrective measures:
• Special design or alternate system
• Inclusions within map unit which are better suited

Local Roads and Streets

Limitation rating: Severe
Limitations:
• Carnasaw—high shrink-swell potential and slope;
• Sherless—slope
Corrective measures:
• High shrink-swell potential—add fill of suitable subgrade material to road bed
• Slope—design to conform to the natural contour

CNC—Carnasaw-Sherless-Clebit complex, 3 to 8 percent slopes

Setting

Landform position: Sideslopes and tops of ridges and mountains
Size of areas: 30 to 200 acres

Composition

Carnasaw and similar soils: 50 percent
Sherless and similar soils: 25 percent
Clebit and similar soils: 15 percent
Minor soils: 10 percent

Typical Profile

Carnasaw

Surface layer:
0 to 4 inches—very dark grayish brown gravelly silt loam

Subsurface layer:
4 to 11 inches—yellowish brown cobbly silt loam

Subsoil:
11 to 27 inches—yellowish red clay

27 to 40 inches—red, mottled clay
40 to 50 inches—mottled red and gray channery clay
50 to 58 inches—mottled strong brown and gray channery silty clay

Bedrock:
58 to 60 inches—fractured and tilted, soft shale with lenses of sandstone

Sherless

Surface layer:
0 to 3 inches—dark grayish brown gravelly fine sandy loam

Subsurface layer:
3 to 7 inches—yellowish brown fine sandy loam

Subsoil:
7 to 17 inches—strong brown sandy clay loam
17 to 27 inches—strong brown gravelly sandy clay loam

Bedrock:
27 to 40 inches—tilted, soft, platy sandstone with lenses of shale

Clebit

Surface layer:
0 to 4 inches—brown very stony fine sandy loam

Subsoil:
4 to 16 inches—yellowish brown very cobbly fine sandy loam

Bedrock:
16 to 18 inches—hard, fractured, and tilted sandstone

Soil Properties and Qualities

Depth class: Carnasaw—deep; Sherless—moderately deep; Clebit—shallow
Drainage class: Well drained
Permeability: Carnasaw—slow; Sherless—moderate; Clebit—moderately rapid
Available water capacity: Carnasaw—moderate; Sherless—low; Clebit—very low
Depth to seasonal high water table: >60 inches
Shrink-swell potential: Carnasaw—high; Clebit and Sherless—low
Hazard of flooding: None
Surface runoff: Medium - high
Soil reaction: Moderately acid or strongly acid in the surface and subsurface layers and strongly acid or very strongly acid in the subsoil
Parent material: Carnasaw—clayey residuum from shale; Sherless—loamy residuum from sandstone and shale; Clebit—loamy residuum from sandstone
Depth to bedrock: Carnasaw—40 to 60 inches; Sherless—20 to 40 inches; Clebit—10 to 20 inches

Inclusions

- Ceda soils
- Kenn soils
- Small areas similar to Carnasaw and Sherless soils with cobbly or stony surface layers
- Small areas of rock outcrop

Land Use

Major Uses: Woodland

Cropland

Land capability subclass: Carnasaw and Sherless—IVe; Clebit—VIIs
Suitability: Poorly suited to not suited
Management concerns:
- Very severe erosion hazard
- Very stony areas of intermingled Clebit soils severely limits equipment use

Pasture and hayland

Suitability: Carnasaw and Sherless—moderately suited; Clebit—generally not suited
Adapted plants: Bermudagrass, bahiagrass, clover, lespedeza, and tall fescue
Management concerns:
- Low fertility levels
- Very stony areas of intermingled Clebit soils

Management measures:
- Proper stocking rates
- Rotation grazing
- Maintain fertility levels
- Weed and brush control

Woodland

Woodland suitability group: Carnasaw and Sherless—7A7; Clebit—3D9
Suitability: Carnasaw and Sherless—moderately suited; Clebit—poorly suited
Adapted species: Shortleaf pine, loblolly pine, eastern red cedar, and southern red oak
Management concerns:
- Carnasaw and Sherless—no significant limitations
- Clebit—moderate equipment limitations, moderate seedling mortality, and severe windthrow hazard

Management measures:
- See Woodland Management and Productivity Section (Pages 68-71)

Urban Uses

Dwellings

Limitation rating: Carnasaw and Clebit—severe; Sherless—slight

Limitations:
- Carnasaw—high shrink-swell potential
- Sherless—no significant limitations
- Clebit—depth to rock and very stony surface

Corrective measures:
- High shrink-swell potential—extra reinforcement in foundations and backfill with sandy material
- Depth to rock and very stony surface—difficult and often impractical to overcome

Small Commercial Buildings

Limitation rating: Carnasaw and Clebit—severe; Sherless—moderate

Limitations:
- Carnasaw—high shrink-swell potential
- Sherless—slope
- Clebit—depth to rock and very stony surface

Corrective measures:
- High shrink-swell potential—extra reinforcement in foundations and backfill with sandy material
- Depth to rock and very stony surface—difficult and often impractical to overcome
- Slope—design to conform to the natural contour

Septic Tank Absorption Fields

Limitation rating: Severe

Limitations:
- Carnasaw—slow permeability
- Sherless—moderate depth to bedrock
- Clebit—shallow depth to bedrock

Corrective measures:
- Special design or alternate system
- Inclusions within map unit which are better suited

Local Roads and Streets

Limitation rating: Carnasaw and Clebit—severe; Sherless—slight

Limitations:
- Carnasaw—high shrink-swell potential
- Sherless—no significant limitations
- Clebit—depth to bedrock and very stony surface

Corrective measures:
- High shrink-swell potential—add fill of suitable subgrade material to road bed
- Depth to rock and very stony surface—difficult and often impractical to overcome

CNE—Carnasaw-Sherless-Clebit complex, 8 to 20 percent slopes

Setting

Landform position: Sideslopes of ridges and mountains
Size of areas: 30 to 1,000 acres

Composition

Carnasaw and similar soils: 50 percent
Sherless and similar soils: 25 percent
Clebit and similar soils: 15 percent
Minor soils: 10 percent

Typical Profile

Carnasaw

Surface layer:
0 to 4 inches—very dark grayish brown cobbly silt loam

Subsurface layer:
4 to 11 inches—yellowish brown cobbly silt loam

Subsoil:
11 to 27 inches—yellowish red clay
27 to 40 inches—red, mottled clay
40 to 50 inches—mottled red and gray channery clay
50 to 58 inches—mottled strong brown and gray channery silty clay

Bedrock:
58 to 60 inches—fractured and tilted, soft shale with lenses of sandstone

Sherless

Surface layer:
0 to 3 inches—dark grayish brown cobbly fine sandy loam

Subsurface layer:
3 to 7 inches—yellowish brown fine sandy loam

Subsoil:
7 to 17 inches—strong brown sandy clay loam
17 to 27 inches—strong brown gravelly sandy clay loam

Bedrock:
27 to 40 inches—tilted, soft, platy sandstone with lenses of shale

Clebit

Surface layer:
0 to 4 inches—brown very stony fine sandy loam

Subsoil:
4 to 16 inches—yellowish brown very cobbly fine sandy loam

Bedrock:
16 to 18 inches—hard, fractured, and tilted sandstone

Soil Properties and Qualities

Depth class: Carnasaw—deep; Sherless—moderately deep; Clebit—shallow
Drainage class: Well drained
Permeability: Carnasaw—slow; Sherless—moderate; Clebit—moderately rapid

Available water capacity: Carnasaw—moderate; Sherless—low; Clebit—very low
Depth to seasonal high water table: >60 inches
Shrink-swell potential: Carnasaw—high; Clebit and Sherless—low
Hazard of flooding: None
Surface runoff: Medium - high
Soil reaction: Moderately acid or strongly acid in the surface and subsurface layers and strongly acid or very strongly acid in the subsoil
Parent material: Carnasaw—clayey residuum from shale; Sherless—loamy residuum from sandstone and shale; Clebit—loamy residuum from sandstone
Depth to bedrock: Carnasaw—40 to 60 inches; Sherless—20 to 40 inches; Clebit—10 to 20 inches

Inclusions

- Ceda soils
- Kenn soils
- Octavia soils
- Small areas similar to Carnasaw and Sherless soils with gravelly or stony surface layers
- Small areas of rock outcrop

Land Use

Major Uses: Woodland

Cropland

Land capability subclass: Carnasaw and Sherless—VIs; Clebit—VIIs
Suitability: Not suited
Management concerns:
- Very severe erosion hazard
- Very stony areas of intermingled Clebit soils severely limits equipment use
- Slope
- Cobbles on the surface

Pasture and hayland

Suitability: Carnasaw and Sherless—poorly suited; Clebit—generally not suited
Adapted plants: Bermudagrass, bahiagrass, clover, lespedeza, and tall fescue
Management concerns:
- Low fertility levels
- Very stony areas of intermingled Clebit soils
- Cobbles on the surface
- Slope

Management measures:
- Proper stocking rates
- Rotation grazing
- Maintain fertility levels
- Weed and brush control

Woodland

Woodland suitability group: Carnasaw and Sherless—7A7; Clebit—3D9
Suitability: Carnasaw and Sherless—moderately suited; Clebit—poorly suited
Adapted species: Shortleaf pine, loblolly pine, eastern red cedar, and southern red oak
Management concerns:
- Carnasaw and Sherless—no significant limitations
- Clebit—moderate equipment limitations, moderate seedling mortality, and severe windthrow hazard

Management measures:
- See Woodland Management and Productivity Section (Pages 68-71)

Urban Uses

Dwellings

Limitation rating: Carnasaw and Clebit—severe; Sherless—moderate
Limitations:
- Carnasaw—high shrink-swell potential
- Sherless—slope
- Clebit—depth to rock and very stony surface

Corrective measures:
- High shrink-swell potential—extra reinforcement in foundations and backfill with sandy material
- Slope—design to conform to the natural contour
- Depth to rock and very stony surface—difficult and often impractical to overcome

Small Commercial Buildings

Limitation rating: Severe
Limitations:
- Carnasaw—high shrink-swell potential and slope
- Sherless—slope
- Clebit—depth to rock, slope, and very stony surface

Corrective measures:
- High shrink-swell potential—extra reinforcement in foundations and backfill with sandy material
- Depth to rock and very stony surface—difficult and often impractical to overcome
- Slope—design to conform to the natural contour

Septic Tank Absorption Fields

Limitation rating: Severe
Limitations:
- Carnasaw—slow permeability
- Sherless—moderate depth to bedrock
- Clebit—shallow depth to bedrock

Corrective measures:
- Special design or alternate system
- Inclusions within map unit which are better suited

Local Roads and Streets

Limitation rating: Carnasaw and Clebit—severe; Sherless—moderate
Limitations:
- Carnasaw—high shrink-swell potential
- Sherless—slope
- Clebit—depth to bedrock and very stony surface

Corrective measures:
- High shrink-swell potential—add fill of suitable subgrade material to road bed
- Depth to rock and very stony surface—difficult and often impractical to overcome
- Slope—design to conform to the natural contour

CNF—Carnasaw-Sherless-Clebit complex, 20 to 35 percent slopes

Setting

Landform position: Steep sideslopes of ridges and mountains
Size of areas: 40 to 800 acres

Composition

Carnasaw and similar soils: 50 percent
Sherless and similar soils: 25 percent
Clebit and similar soils: 15 percent
Minor soils: 10 percent

Typical Profile

Carnasaw

Surface layer:
0 to 4 inches—very dark grayish brown stony silt loam

Subsurface layer:
4 to 11 inches—yellowish brown cobbly silt loam

Subsoil:
11 to 27 inches—yellowish red clay
27 to 40 inches—red, mottled clay
40 to 50 inches—mottled red and gray channery clay
50 to 58 inches—mottled strong brown and gray channery silty clay

Bedrock:
58 to 60 inches—fractured and tilted, soft shale with lenses of sandstone

Sherless

Surface layer:
0 to 3 inches—dark grayish brown stony fine sandy loam

Subsurface layer:
3 to 7 inches—yellowish brown fine sandy loam

Subsoil:
7 to 17 inches—strong brown sandy clay loam
17 to 27 inches—strong brown gravelly sandy clay loam

Bedrock:
27 to 40 inches—tilted, soft, platy sandstone with lenses of shale

Clebit

Surface layer:
0 to 4 inches—brown very stony fine sandy loam

Subsoil:
4 to 16 inches—yellowish brown very cobbly fine sandy loam

Bedrock:
16 to 18 inches—hard, fractured, and tilted sandstone

Soil Properties and Qualities

Depth class: Carnasaw—deep; Sherless—moderately deep; Clebit—shallow
Drainage class: Well drained
Permeability: Carnasaw—slow; Sherless—moderate; Clebit—moderately rapid
Available water capacity: Carnasaw—moderate; Sherless—low; Clebit—very low
Depth to seasonal high water table: >60 inches
Shrink-swell potential: Carnasaw—high; Clebit and Sherless—low
Hazard of flooding: None
Surface runoff: Very high
Soil reaction: Moderately acid or strongly acid in the surface and subsurface layers and strongly acid or very strongly acid in the subsoil
Parent material: Carnasaw—clayey residuum from shale; Sherless—loamy residuum from sandstone and shale; Clebit—loamy residuum from sandstone
Depth to bedrock: Carnasaw—40 to 60 inches; Sherless—20 to 40 inches; Clebit—10 to 20 inches

Inclusions

- Ceda soils
- Kenn soils
- Octavia soils
- Small areas similar to Carnasaw and Sherless soils with gravelly or cobbly surface layers
- Small areas of rock outcrop

Land Use

Major Uses: Woodland

Cropland

Land Capability subclass: VIIs
Suitability: Not suited

Management concerns:
- Very severe erosion hazard
- Very stony areas of intermingled Clebit soils severely limits equipment use
- Steep slopes

Pasture and hayland

Suitability: Carnasaw and Sherless—poorly suited; Clebit—generally not suited
Adapted plants: Fescue and native grasses
Management concerns:
- Low fertility levels
- Very stony areas of intermingled Clebit soils
- Steep slopes

Management measures:
- Proper stocking rates
- Rotation grazing
- Maintain fertility levels
- Weed and brush control

Woodland

Woodland suitability group: Carnasaw and Sherless—6R8; Clebit—3D9
Suitability: Carnasaw and Sherless—moderately suited; Clebit—poorly suited
Adapted species: Shortleaf pine, loblolly pine, eastern red cedar, and southern red oak
Management concerns:
- Carnasaw and Sherless—moderate erosion hazard and moderate equipment limitations
- Clebit—moderate equipment limitations, moderate seedling mortality, and severe windthrow hazard

Management measures:
- See Woodland Management and Productivity Section (Pages 68-71)

Urban Uses

Dwellings

Limitation rating: Severe
Limitations:
- Carnasaw—high shrink-swell potential and slope
- Sherless—slope
- Clebit—depth to rock, slope, and very stony surface

Corrective measures:
- High shrink-swell potential—extra reinforcement in foundations and backfill with sandy material
- Slope—design to conform to the natural contour
- Depth to rock and very stony surface—difficult and often impractical to overcome

Small Commercial Buildings

Limitation rating: Severe
Limitations:
- Carnasaw—high shrink-swell potential and slope
- Sherless—slope
- Clebit—depth to rock, slope, and very stony surface

Corrective measures:
- High shrink-swell potential—extra reinforcement in foundations and backfill with sandy material
- Depth to rock and very stony surface—difficult and often impractical to overcome
- Slope—design to conform to the natural contour

Septic Tank Absorption Fields

Limitation rating: Severe
Limitations:
- Carnasaw—slow permeability and slope
- Sherless—moderate depth to bedrock and slope
- Clebit—shallow depth to bedrock and slope

Corrective measures:
- Special design or alternate system
- Inclusions within map unit which are better suited

Local Roads and Streets

Limitation rating: Severe
Limitations:
- Carnasaw—high shrink-swell potential and slope
- Sherless—slope
- Clebit—depth to bedrock, slope, and very stony surface

Corrective measures:
- High shrink-swell potential—add fill of suitable subgrade material to road bed
- Depth to rock and very stony surface—difficult and often impractical to overcome
- Slope—design to conform to the natural contour

Cr—Ceda very cobbly loam, frequently flooded

Setting

Landform position: Narrow flood plains of small streams
Size of areas: 10 to 60 acres

Typical Profile

Surface layer:
0 to 7 inches—dark grayish brown very cobbly loam

Substratum:
7 to 13 inches—dark yellowish brown very gravelly loam
13 to 72 inches—strong brown very gravelly loam

Inclusions

- Kenn soils
- Wilburton soils
- Soils similar to Ceda, except for being <60 inches to bedrock

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
Permeability: Rapid
Available water capacity: Low
Depth to seasonal high water table: >72 inches
Shrink-swell potential: None
Hazard of flooding: Frequent
Surface runoff: Negligible
Soil reaction: Slightly acid or moderately acid
Parent material: Loamy and gravelly alluvium

Land Use

Major Uses: Woodland

Cropland

Land capability subclass: VIIw
Suitability: Not suited
Management concerns:
- Flooding
- Surface cobbles
- Droughtiness

Pasture

Suitability: Poorly suited
Adapted plants: Bermudagrass, bahiagrass, tall fescue, and white clover
Management concerns:
- Surface cobbles
- Flooding
- Droughtiness

Management measures:
- Proper stocking rates
- Rotation grazing
- Maintaining fertility levels
- Weed and brush control

Woodland

Woodland suitability group: 7W9
Suitability: Moderately suited
Adapted species: Loblolly pine, shortleaf pine, American sycamore, and sweetgum
Management concerns:
- Seedling mortality
- Very cobbly surface
- Flooding

Management measures:
- See Woodland Management and Productivity Section (Pages 68-71)

Urban Uses

Dwellings

Limitation rating: Severe
Limitations:
- Frequent flooding

Corrective measures:
- Inclusions above flood prone areas or other sites

Small Commercial Buildings

Limitation rating: Severe
Limitations:
- Frequent flooding

Corrective measures:
- Inclusions above flood prone areas or other sites

Septic Tank Absorption Fields

Limitation rating: Severe
Limitations:
- Frequent flooding
- Poor filter
- Rapid permeability

Corrective measures:
- Inclusions above flood prone areas or other sites

Local Roads and Streets

Limitation rating: Severe
Limitations:
- Frequent flooding

Corrective measures:
- Inclusions above flood prone areas or other sites

CSG—Clebit-Sherless-Carnasaw complex, 35 to 60 percent slopes

Setting

Landform position: Very steep sideslopes of ridges and mountains
Size of areas: 30 to 800 acres

Composition

Clebit and similar soils: 45 percent
Sherless and similar soils: 25 percent
Carnasaw and similar soils: 20 percent
Minor soils: 10 percent

Typical Profile

Clebit

Surface layer:
0 to 4 inches—brown very stony fine sandy loam

Subsoil:
4 to 16 inches—yellowish brown very cobbly fine sandy loam

Bedrock:
16 to 18 inches—hard, fractured, and tilted sandstone

Sherless

Surface layer:
0 to 3 inches—dark grayish brown stony fine sandy loam

Subsurface layer:
3 to 7 inches—yellowish brown fine sandy loam

Subsoil:
7 to 17 inches—strong brown sandy clay loam
17 to 27 inches—strong brown gravelly sandy clay loam

Bedrock:
27 to 40 inches—tilted, soft, platy sandstone with lenses of shale

Carnasaw

Surface layer:
0 to 4 inches—very dark grayish brown very stony silt loam

Subsurface layer:
4 to 11 inches—yellowish brown cobbly silt loam

Subsoil:
11 to 27 inches—yellowish red clay
27 to 40 inches—red, mottled clay
40 to 50 inches—mottled red and gray channery clay
50 to 58 inches—mottled strong brown and gray channery silty clay

Bedrock:
58 to 60 inches—fractured and tilted, soft shale with lenses of sandstone

Soil Properties and Qualities

Depth class: Clebit—shallow; Sherless—moderately deep; Carnasaw—deep
Drainage class: Well drained
Permeability: Clebit—moderately rapid; Sherless—moderate; Carnasaw—slow
Available water capacity: Clebit—very low; Sherless—low; Carnasaw—moderate
Depth to seasonal high water table: >60 inches
Shrink-swell potential: Clebit and Sherless—low; Carnasaw—high
Hazard of flooding: None
Surface runoff: Very high
Soil reaction: Moderately acid or strongly acid in the surface and subsurface layers and strongly acid or very strongly acid in the subsoil
Parent material: Clebit—loamy residuum from sandstone; Sherless—loamy residuum from sandstone and shale; Carnasaw—clayey residuum from shale
Depth to bedrock: Clebit—10 to 20 inches; Sherless—20 to 40 inches; Carnasaw—40 to 60 inches

Inclusions

- Caston soils
- Octavia soils
- Small areas similar to Carnasaw and Sherless soils with gravelly or cobbly surface layers
- Small areas of rock outcrop

Land Use

Major Uses: Woodland

Cropland

Land Capability subclass: VIIs
Suitability: Not suited
Management concerns:
- Very steep slopes
- Very severe erosion hazard
- Surface stones

Pasture and hayland

Suitability: Not suited
Management concerns:
- Very steep slopes
- Very severe erosion hazard
- Surface stones

Woodland

Woodland suitability group: Clebit—3R9; Carnasaw and Sherless—6R9
Suitability: Clebit—poorly suited; Carnasaw and Sherless—moderately suited
Adapted species: Shortleaf pine, loblolly pine, eastern red cedar, and southern red oak
Management concerns:
- Clebit—severe equipment limitations, severe erosion hazard, moderate seedling mortality, and severe windthrow hazard
- Carnasaw and Sherless—severe erosion hazard and severe equipment limitations

Management measures:
- See Woodland Management and Productivity Section (Pages 68-71)

Urban Uses

Dwellings

Limitation rating: Severe
Limitations:
- Very steep slopes
- Surface stones
- Clebit—shallow depth to rock

Management measures:
- Limitations are usually difficult or impractical to overcome

Small Commercial Buildings

Limitation rating: Severe
Limitations:
- Very steep slopes
- Surface stones
- Clebit—shallow depth to rock

Management measures:
- Limitations are usually difficult or impractical to overcome

Septic Tank Absorption Fields

Limitation rating: Severe
Limitations:
- Very steep slopes
- Surface stones
- Clebit—shallow depth to rock

Management measures:
- Limitations are usually difficult or impractical to overcome

Local Roads and Streets

Limitation rating: Severe
Limitations:
- Very steep slopes
- Surface stones
- Clebit—shallow depth to rock

Management measures:
- Limitations are usually difficult or impractical to overcome

Cu—Cupco silt loam, occasionally flooded

Setting

Landform position: Flood plains
Size of areas: 10 to 300 acres

Typical Profile

Surface layer:
0 to 8 inches—dark grayish brown, mottled silt loam

Subsoil:
8 to 15 inches—grayish brown, mottled silt loam
15 to 30 inches—dark grayish brown, mottled silty clay loam
30 to 72 inches—brown, mottled silty clay loam

Inclusions

- Spadra soils
- Neff soils
- Areas that are subject to frequent flooding
- Small areas of soils that are poorly drained

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderately slow
Available water capacity: High
Depth to seasonal high water table: 0.5 to 2 feet
Shrink-swell potential: Low
Hazard of flooding: Occasional
Surface runoff: Low
Soil reaction: Slightly acid to strongly acid in the surface layer and upper part of the subsoil, moderately acid to very strongly acid in the middle part of the subsoil, and moderately acid to strongly acid in the lower part of the subsoil
Parent material: Loamy alluvium

Land Use

Major Uses: Pasture

Cropland

Land capability subclass: IIIw
Suitability: Moderately suited
Adapted crops: Soybeans, grain sorghum, and winter small grains
Management concerns:
- Occasional flooding
- Excess surface water

Management measures:
- Surface drainage
- Minimum tillage
- Crop residue management

Pasture

Suitability: Moderately suited
Adapted plants: Common bermudagrass, bahiagrass, white clover, and tall fescue
Management concerns:
- Occasional flooding
- Seasonal wetness

Management measures:
- Surface drainage
- Proper stocking rates
- Rotation grazing
- Weed and brush control

Woodland

Woodland suitability group: 9W9
Suitability: Well suited
Adapted species: Loblolly pine, shortleaf pine, willow oak, and water oak
Management concerns:
- Wetness may restrict equipment use
- Moderate seedling mortality
- Windthrow hazard

Management measures:
• See Woodland Management and Productivity Section (Pages 68-71)

Urban Uses

Dwellings

Limitation rating: Severe
Limitations:
• Wetness
• Flooding
Corrective measures:
• Inclusions above flood prone areas or other sites

Small Commercial Buildings

Limitation rating: Severe
Limitations:
• Wetness
• Flooding
Corrective measures:
• Inclusions above flood prone areas or other sites

Septic Tank Absorption Fields

Limitation rating: Severe
Limitations:
• Moderately slow permeability
• Wetness
• Flooding
Corrective measures:
• Inclusions above flood prone areas or other sites

Local Roads and Streets

Limitation rating: Severe
Limitations:
• Wetness
• Flooding
Corrective measures:
• Inclusions above flood prone areas or other sites

EdC—Enders gravelly silt loam, 3 to 8 percent slopes

Setting

Landform position: Sidelopes and footslopes of ridges and mountains
Size of areas: 10 to 100 acres

Typical Profile

Surface layer:
0 to 4 inches—dark brown grave ly silt loam

Subsoil:
4 to 9 inches—strong brown loam
9 to 45 inches—yellowish red, mottled silty clay
45 to 57 inches—mottled yellowish brown, yellowish red, and light gray channery silty clay

Bedrock:
57 to 65 inches—soft, weathered, level-bedded shale

Inclusions

• Cane soils
• Leadvale soils
• Linker soils
• Mountainburg soils
• Nella soils
• Small areas with silt loam surface layers

Soil Properties and Qualities

Depth class: Deep
Drainage class: Well drained
Permeability: Very slow
Available water capacity: Moderate
Depth to seasonal high water table: >60 inches
Shrink-swell potential: High
Hazard of flooding: None
Surface runoff: High
Soil reaction: Strongly acid to extremely acid
Parent material: Thin layer of loamy colluvium over clayey residuum from shale

Land Use

Major Uses: Pasture

Cropland

Land capability subclass: IVe
Suitability: Poorly suited
Management concerns:
• Very severe erosion hazard
Management measures:
• Crop selection to include sown crops
• Maintain close growing cover
• Terracing

Pasture

Suitability: Moderately suited
Adapted plants: Bermudagrass, bahiagrass, tall fescue, and lespedeza
Management concerns:
• Erosion hazard
• Low fertility levels
Management measures:
• Proper stocking rates
• Rotation grazing
• Maintaining fertility rates
• Weed and brush control

Woodland

Woodland suitability group: 6C8
Suitability: Moderately suited
Adapted species: Loblolly pine, shortleaf pine, and southern red oak
Management concerns:
• Moderate equipment limitations due to clayey subsoil near surface
Management measures:
• See Woodland Management and Productivity Section (Pages 68-71)

Urban Uses

Dwellings

Limitation rating: Severe
Limitations:
• High shrink-swell potential
Corrective measures:
• Extra reinforcement in foundations
• Backfill with sandy material

Small Commercial Buildings

Limitation rating: Severe
Limitations:
• High shrink-swell potential
Corrective measures:
• Extra reinforcement in foundations
• Backfill with sandy material

Septic Tank Absorption Fields

Limitation rating: Severe
Limitations:
• Very slow permeability
Corrective measures:
• Special design or alternate system

Local Roads and Streets

Limitation rating: Severe
Limitations:
• High shrink-swell potential
• Low strength
Corrective measures:
• Construction on suitable subgrade or base material

EdE—Enders gravelly silt loam, 8 to 20 percent slopes

Setting

Landform position: Sideslopes of ridges and mountains
Size of areas: 10 to 100 acres

Typical Profile

Surface layer:
0 to 4 inches—dark brown gravelly silt loam

Subsoil:
4 to 9 inches—strong brown loam
9 to 45 inches—yellowish red, mottled silty clay
45 to 57 inches—mottled yellowish brown, yellowish red, and light gray channery silty clay

Bedrock:
57 to 65 inches—soft, weathered, level-bedded shale

Inclusions

• Nella soils
• Mountainburg soils
• Small areas with stony silt loam surface layers

Soil Properties and Qualities

Depth class: Deep
Drainage class: Well drained
Permeability: Very slow
Available water capacity: Moderate
Depth to seasonal high water table: >60 inches
Shrink-swell potential: High
Hazard of flooding: None
Surface runoff: Very high
Soil reaction: Strongly acid to extremely acid
Parent material: Thin layer of loamy colluvium over clayey residuum from shale

Land Use

Major Uses: Pasture

Cropland

Land capability subclass: VIe
Suitability: Not suited
Management concerns:
• Very severe erosion hazard
• Slope

Pasture

Suitability: Poorly suited
Adapted plants: Bermudagrass, bahiagrass, tall fescue, annual lespedeza, and sericea lespedeza
Management concerns:
• Erosion hazard
• Slope
• Low fertility levels
Management measures:
• Weed and brush control
• Maintaining fertility levels
• Proper stocking rates
• Rotation grazing

Woodland

Woodland suitability group: 6C8
Suitability: Moderately suited
Adapted species: Loblolly pine, shortleaf pine, and southern red oak
Management concerns:
• Moderate equipment limitations due to clayey subsoil near surface
Management measures:
• See Woodland Management and Productivity Section (Pages 68-71)

Urban Uses

Dwellings

Limitation rating: Severe
Limitations:
• High shrink-swell potential
Corrective measures:
• Extra reinforcement in foundations
• Backfill with sandy material

Small Commercial Buildings

Limitation rating: Severe
Limitations:
• High shrink-swell potential
• Slope
Corrective measures:
• Extra reinforcement in foundations
• Backfill with sandy material
• Special design to conform to the natural slope

Septic Tank Absorption Fields

Limitation rating: Severe
Limitations:
• Very slow permeability
Corrective measures:
• Special design or alternate system

Local Roads and Streets

Limitation rating: Severe
Limitations:
• High shrink-swell potential
• Low strength
Corrective measures:
• Construction on suitable subgrade or base material

EdF—Enders stony silt loam, 20 to 40 percent slopes

Setting

Landform position: Steep sideslopes of ridges and mountains
Size of areas: 50 to 300 acres

Typical Profile

Surface layer:
0 to 4 inches—dark brown stony silt loam

Subsoil:
4 to 9 inches—strong brown loam
9 to 45 inches—yellowish red, mottled silty clay
45 to 57 inches—mottled yellowish brown, yellowish red, and light gray channery silty clay

Bedrock:
57 to 65 inches—soft, weathered, level-bedded shale

Inclusions

• Nella soils
• Mountainburg soils

Soil Properties and Qualities

Depth class: Deep
Drainage class: Well drained
Permeability: Very slow
Available water capacity: Moderate
Depth to seasonal high water table: >60 inches
Shrink-swell potential: High
Hazard of flooding: None
Surface runoff: Very high
Soil reaction: Strongly acid to extremely acid
Parent material: Thin layer of loamy colluvium over clayey residuum from shale

Land Use

Major Uses: Woodland

Cropland

Land capability subclass: VIIs
Suitability: Not suited
Management concerns:
• Very severe erosion hazard
• Steep slopes
• Surface stones

Pasture

Suitability: Poorly suited
Management concerns:
• Steep slopes
• Surface stones
• Very severe erosion hazard

Woodland

Woodland suitability group: 6R8
Suitability: Moderately suited
Adapted species: Loblolly pine, shortleaf pine, and southern red oak

Management concerns:
- Moderate erosion hazard
- Moderate equipment limitations due to slope, clayey subsoil, and surface stones

Management measures:
- See Woodland Management and Productivity Section (Pages 68-71)

Urban Uses

Dwellings

Limitation rating: Severe
Limitations:
- High shrink-swell potential
- Slope

Corrective measures:
- Extra reinforcement in foundations
- Backfill with sandy material
- Special design to conform to the natural slope

Small Commercial Buildings

Limitation rating: Severe
Limitations:
- High shrink-swell potential
- Slope

Corrective measures:
- Extra reinforcement in foundations
- Backfill with sandy material
- Special design to conform to the natural slope

Septic Tank Absorption Fields

Limitation rating: Severe
Limitations:
- Very slow permeability
- Slope

Corrective measures:
- Special design or alternate system

Local Roads and Streets

Limitation rating: Severe
Limitations:
- Slope
- High shrink-swell potential
- Low strength

Corrective measures:
- Construction on a suitable subgrade or base material on the contour

EME—Enders-Mountainburg complex, 8 to 20 percent slopes

Setting

Landform position: Tops and sides of ridges and mountains

Size of areas: 50 to 600 acres

Composition

Enders and similar soils: 50 percent
Mountainburg and similar soils: 30 percent
Minor soils: 20 percent

Typical Profile

Enders

Surface layer:
0 to 4 inches—dark brown stony silt loam

Subsoil:
4 to 9 inches—strong brown loam
9 to 45 inches—yellowish red, mottled silty clay
45 to 57 inches—mottled yellowish brown, yellowish red, and light gray channery silty clay

Bedrock:
57 to 60 inches—soft, weathered, level-bedded shale

Mountainburg

Surface layer:
0 to 4 inches—dark brown stony fine sandy loam

Subsoil:
4 to 9 inches—strong brown gravelly fine sandy loam
9 to 16 inches—yellowish red very gravelly sandy clay loam

Bedrock:
16 to 20 inches—hard, level-bedded sandstone

Soil Properties and Qualities

Depth class: Enders—deep; Mountainburg—shallow
Drainage class: Well drained
Permeability: Enders—very slow; Mountainburg—moderately rapid
Available water capacity: Enders—moderate; Mountainburg—very low
Depth to seasonal high water table: >60 inches
Shrink-swell potential: Enders—high; Mountainburg—low
Hazard of flooding: None
Surface runoff: Medium - high
Soil reaction: Enders—strongly acid to extremely acid; Mountainburg—moderately acid or strongly acid in the surface and subsurface layers and strongly acid or very strongly acid in the subsoil
Parent material: Enders—thin layer of loamy colluvium over clayey residuum from shale; Mountainburg—loamy and gravelly residuum from sandstone
Depth to bedrock: Enders—40 to 60 inches; Mountainburg—10 to 20 inches

Inclusions

- Nella soils
- Small areas with gravelly, cobbly, or very stony surface layers
- Small areas of rock outcrop

Land Use

Major Uses: Woodland

Cropland

Land capability subclass: Enders—VIs; Mountainburg—VIIs
Suitability: Not suited
Management concerns:
- Surface stones
- Slope
- Very severe erosion hazard

Pasture and hayland

Suitability: Enders—poorly suited; Mountainburg—generally not suited
Adapted plants: Bermudagrass, bahiagrass, clover, lespedeza, and tall fescue
Management concerns:
- Low fertility levels
- Surface stones
- Slope

Management measures:
- Proper stocking rates
- Rotation grazing
- Maintain fertility levels
- Weed and brush control

Woodland

Woodland suitability group: Enders—6X8; Mountainburg—5D3
Suitability: Enders—moderately suited; Mountainburg—poorly suited
Adapted species: Shortleaf pine, loblolly pine, eastern red cedar, and southern red oak
Management concerns:
- Enders and Mountainburg—moderate equipment limitations
- Mountainburg—also, moderate seedling mortality and severe windthrow hazard

Management measures:
- See Woodland Management and Productivity Section (Pages 68-71)

Urban Uses

Dwellings

Limitation rating: Severe
Limitations:
- Enders—high shrink-swell potential
- Mountainburg—depth to rock and large stones

Corrective measures:
- High shrink-swell potential—extra reinforcement in foundations and backfill with sandy material
- Depth to rock and large stones—difficult and often impractical to overcome

Small Commercial Buildings

Limitation rating: Severe
Limitations:
- Enders—high shrink-swell potential and slope
- Mountainburg—depth to rock, slope, and large stones

Corrective measures:
- High shrink-swell potential—extra reinforcement in foundations and backfill with sandy material
- Depth to rock and large stones—difficult and often impractical to overcome
- Slope—design to conform to the natural contour

Septic Tank Absorption Fields

Limitation rating: Severe
Limitations:
- Enders—very slow permeability
- Mountainburg—depth to rock and large stones

Corrective measures:
- Special design or alternate system
- Inclusions within map unit which are better suited

Local Roads and Streets

Limitation rating: Severe
Limitations:
- Enders—high shrink-swell potential
- Mountainburg—depth to rock and large stones

Corrective measures:
- High shrink-swell potential—add fill of suitable subgrade to road bed
- Depth to rock and large stones—difficult and often impractical to overcome

EMF—Enders-Mountainburg complex, 20 to 40 percent slopes

Setting

Landform position: Steep sideslopes of ridges and mountains
Size of areas: 50 to 1,000 acres

Composition

Enders and similar soils: 65 percent
Mountainburg and similar soils: 25 percent
Minor soils: 10 percent

Typical Profile

Enders

Surface layer:
0 to 4 inches—dark brown stony silt loam

Subsoil:
4 to 9 inches—strong brown loam
9 to 45 inches—yellowish red, mottled silty clay
45 to 57 inches—mottled yellowish brown, yellowish red, and light gray channery silty clay

Bedrock:
57 to 60 inches—soft, weathered, level-bedded shale

Mountainburg

Surface layer:
0 to 4 inches—dark brown stony fine sandy loam

Subsoil:
4 to 9 inches—strong brown gravelly fine sandy loam
9 to 16 inches—yellowish red very gravelly sandy clay loam

Bedrock:
16 to 20 inches—hard, level-bedded sandstone

Soil Properties and Qualities

Depth class: Enders—deep; Mountainburg—shallow
Drainage class: Well drained
Permeability: Enders—very slow; Mountainburg—moderately rapid
Available water capacity: Enders—moderate; Mountainburg—very low
Depth to seasonal high water table: >60 inches
Shrink-swell potential: Enders—high; Mountainburg—low
Hazard of flooding: None
Surface runoff: High - very high
Soil reaction: Enders—strongly acid to extremely acid; Mountainburg—moderately acid or strongly acid in the surface and subsurface layers and strongly acid or very strongly acid in the subsoil
Parent material: Enders—thin layer of loamy colluvium over clayey residuum from shale; Mountainburg—loamy and gravelly residuum from sandstone
Depth to bedrock: Enders—40 to 60 inches; Mountainburg—10 to 20 inches

Inclusions

- Nella soils
- Small areas with gravelly, cobbly, or very stony surface layers
- Small areas of rock outcrop

Land Use

Major Uses: Woodland

Cropland

Land capability subclass: VIIs
Suitability: Not suited
Management concerns:
- Surface stones
- Steep slopes
- Very severe erosion hazard

Pasture and hayland

Suitability: Enders—poorly suited; Mountainburg—generally not suited
Adapted plants: Fescue and native grasses
Management concerns:
- Low fertility levels
- Surface stones
- Steep slopes

Management measures:
- Proper stocking rates
- Rotation grazing
- Maintain fertility levels
- Weed and brush control

Woodland

Woodland suitability group: Enders—6R8; Mountainburg—5D3
Suitability: Enders—moderately suited; Mountainburg—poorly suited
Adapted species: Shortleaf pine, loblolly pine, eastern red cedar, and southern red oak
Management concerns:
- Enders and Mountainburg—moderate equipment limitations and moderate erosion hazard
- Mountainburg—also, moderate seedling mortality and severe windthrow hazard

Management measures:
- See Woodland Management and Productivity Section (Pages 68-71)

Urban Uses

Dwellings

Limitation rating: Severe
Limitations:
- Enders—high shrink-swell potential and slope
- Mountainburg—depth to rock, slope, and large stones

Corrective measures:
- High shrink-swell potential—extra reinforcement in foundations and backfill with sandy material
- Depth to rock and large stones—difficult and often impractical to overcome
- Slope—design to conform to the natural contour

Small Commercial Buildings

Limitation rating: Severe

Limitations:
- Enders—high shrink-swell potential and slope
- Mountainburg—depth to rock, slope, and large stones

Corrective measures:
- High shrink-swell potential—extra reinforcement in foundations and backfill with sandy material
- Depth to rock and large stones—difficult and often impractical to overcome
- Slope—design to conform to the natural contour

Septic Tank Absorption Fields

Limitation rating: Severe
Limitations:
- Enders—very slow permeability and slope
- Mountainburg—depth to rock, slope, and large stones

Corrective measures:
- Special design or alternate system
- Inclusions within map unit which are better suited

Local Roads and Streets

Limitation rating: Severe
Limitations:
- Enders—high shrink-swell potential and slope
- Mountainburg—depth to rock, slope, and large stones

Corrective measures:
- High shrink-swell potential—add fill of suitable subgrade to road bed
- Depth to rock and large stones—difficult and often impractical to overcome
- Slope—design to conform to the natural contour

EMG—Enders-Mountainburg complex, 40 to 65 percent slopes

Setting

Landform position: Very steep sideslopes of ridges and mountains
Size of areas: 50 to 600 acres

Composition

Enders and similar soils: 60 percent
Mountainburg and similar soils: 25 percent
Minor soils: 15 percent

Typical Profile

Enders

Surface layer:
0 to 4 inches—dark brown stony silt loam

Subsoil:
4 to 9 inches—strong brown loam
9 to 45 inches—yellowish red, mottled silty clay
45 to 57 inches—mottled yellowish brown, yellowish red, and light gray channery silty clay

Bedrock:
57 to 60 inches—soft, weathered, level-bedded shale

Mountainburg

Surface layer:
0 to 4 inches—dark brown stony fine sandy loam

Subsoil:
4 to 9 inches—strong brown gravelly fine sandy loam
9 to 16 inches—yellowish red very gravelly sandy clay loam

Bedrock:
16 to 20 inches—hard, level-bedded sandstone

Soil Properties and Qualities

Depth class: Enders—deep; Mountainburg—shallow
Drainage class: Well drained
Permeability: Enders—very slow; Mountainburg—moderately rapid
Available water capacity: Enders—moderate; Mountainburg—very low
Depth to seasonal high water table: >60 inches
Shrink-swell potential: Enders—high; Mountainburg—low
Hazard of flooding: None
Surface runoff: Very high
Soil reaction: Enders—strongly acid to extremely acid; Mountainburg—moderately acid or strongly acid in the surface and subsurface layers and strongly acid or very strongly acid in the subsoil
Parent material: Enders—thin layer of loamy colluvium over clayey residuum from shale; Mountainburg—loamy and gravelly residuum from sandstone
Depth to bedrock: Enders—40 to 60 inches; Mountainburg—10 to 20 inches

Inclusions

- Nella soils
- Small areas with slopes less than 40 percent
- Small areas of rock outcrop

Land Use

Major Uses: Woodland

Cropland

Land capability subclass: VIIs
Suitability: Not suited
Management concerns:
- Surface stones
- Very steep slopes
- Very severe erosion hazard

Pasture and hayland

Suitability: Not suited

Management concerns:
- Low fertility levels
- Surface stones
- Very steep slopes

Woodland

Woodland suitability group: Enders—6R9; Mountainburg—5R3
Suitability: Enders—moderately suited; Mountainburg—poorly suited
Adapted species: Shortleaf pine, loblolly pine, eastern red cedar, and southern red oak
Management concerns:
- Enders and Mountainburg—severe equipment limitations and severe erosion hazard
- Mountainburg—also, moderate seedling mortality and severe windthrow hazard

Management measures:
- See Woodland Management and Productivity Section (Pages 68-71)

Urban Uses

Dwellings

Limitation rating: Severe
Limitations:
- Enders—high shrink-swell potential and very steep slopes
- Mountainburg—depth to rock, very steep slopes, and large stones

Corrective measures:
- Limitations are difficult and often impractical to overcome

Small Commercial Buildings

Limitation rating: Severe
Limitations:
- Enders—high shrink-swell potential and very steep slopes
- Mountainburg—depth to rock, very steep slopes, and large stones

Corrective measures:
- Limitations are difficult and often impractical to overcome

Septic Tank Absorption Fields

Limitation rating: Severe
Limitations:
- Enders—very slow permeability and very steep slopes
- Mountainburg—depth to rock, very steep slopes and large stones

Corrective measures:
- Limitations are difficult and often impractical to overcome

Local Roads and Streets

Limitation rating: Severe
Limitations:
- Enders—high shrink-swell potential and very steep slopes
- Mountainburg—depth to rock, very steep slopes, and large stones

Corrective measures:
Limitations are difficult and often impractical to overcome

EwC—Endsaw gravelly loam, 3 to 8 percent slopes

Setting

Landform position: Sideslopes and footslopes of ridges and mountains
Size of areas: 10 to 50 acres

Typical Profile

Surface layer:
0 to 4 inches—brown gravelly loam

Subsoil:
4 to 36 inches—yellowish red silty clay
36 to 51 inches—yellowish red, mottled, channery silty clay

Bedrock:
51 to 72 inches—partially weathered, soft, fractured shale

Inclusions

- Carnasaw soils
- Enders soils
- Mountainburg soils

Soil Properties and Qualities

Depth class: Deep
Drainage class: Well drained
Permeability: Slow
Available water capacity: Moderate
Depth to seasonal high water table: >60 inches
Shrink-swell potential: High
Hazard of flooding: None
Surface runoff: Medium - high
Soil reaction: Moderately acid or strongly acid in the surface layer and strongly acid or very strongly acid in the subsoil
Parent material: Thin layer of loamy colluvium over clayey residuum weathered from acid shale

Land Use

Major Uses: Pasture

Cropland

Land capability subclass: IVe
Suitability: Poorly suited
Management concerns:
- Very severe erosion hazard

Management measures:
- Crop selection to include sown crops
- Maintain close growing cover
- Terracing

Pasture

Suitability: Moderately suited
Adapted plants: Bermudagrass, bahiagrass, tall fescue, and lespedeza
Management concerns:
- Erosion hazard
- Low fertility levels

Management measures:
- Proper stocking rates
- Rotation grazing
- Maintaining fertility levels
- Weed and brush control

Woodland

Woodland suitability group: 6C8
Suitability: Moderately suited
Adapted species: Loblolly pine, shortleaf pine, and southern red oak
Management concerns:
- Moderate equipment limitations due to clayey subsoil near surface

Management measures:
- See Woodland Management and Productivity Section (Pages 68-71)

Urban Uses

Dwellings

Limitation rating: Severe
Limitations:
- High shrink-swell potential

Corrective measures:
- Extra reinforcement in foundations
- Backfill with sandy material

Small Commercial Buildings

Limitation rating: Severe
Limitations:
- High shrink-swell potential

Corrective measures:
- Extra reinforcement in foundations
- Backfill with sandy material

Septic Tank Absorption Fields

Limitation rating: Severe
Limitations:
- Slow permeability

Corrective measures:
- Special design or alternate system

Local Roads and Streets

Limitation rating: Severe
Limitations:
- High shrink-swell potential
- Low strength

Corrective measures:
- Construction on suitable subgrade or base material

EwE—Endsaw cobbly loam, 8 to 20 percent slopes

Setting

Landform position: Sideslopes of ridges and mountains
Size of areas: 10 to 40 acres

Typical Profile

Surface layer:
0 to 4 inches—brown cobbly loam

Subsoil:
4 to 36 inches—yellowish red silty clay
36 to 51 inches—yellowish red, mottled, channery silty clay

Bedrock:
51 to 72 inches—partially weathered, soft, fractured shale

Inclusions

- Carnasaw soils
- Enders soils
- Mountainburg soils

Soil Properties and Qualities

Depth class: Deep
Drainage class: Well drained
Permeability: Slow
Available water capacity: Moderate
Depth to seasonal high water table: >60 inches
Shrink-swell potential: High
Hazard of flooding: None
Surface runoff: Very high
Soil reaction: Moderately acid or strongly acid in the surface layer and strongly acid or very strongly acid in the subsoil
Parent material: Thin layer of loamy colluvium over clayey residuum weathered from acid shale

Land Use

Major Uses: Woodland

Cropland

Land capability subclass: VIs
Suitability: Not suited
Management concerns:
- Very severe erosion hazard
- Slope
- Surface cobbles

Pasture

Suitability: Poorly suited
Adapted plants: Bermudagrass, bahiagrass, tall fescue, annual lespedeza, and sericea lespedeza
Management concerns:
- Slope
- Surface cobbles
- Erosion hazard
- Low fertility levels

Management measures:
- Weed and brush control
- Maintaining fertility levels
- Proper stocking rates
- Rotation grazing

Woodland

Woodland suitability group: 6C8
Suitability: Moderately suited
Adapted species: Loblolly pine, shortleaf pine, and southern red oak
Management concerns:
- Moderate equipment limitations due to clayey subsoil near surface

Management measures:
- See Woodland Management and Productivity Section (Pages 68-71)

Urban Uses

Dwellings

Limitation rating: Severe
Limitations:
- High shrink-swell potential

Corrective measures:
- Extra reinforcement in foundations
- Backfill with sandy material

Small Commercial Buildings

Limitation rating: Severe
Limitations:
- High shrink-swell potential
- Slope

Corrective measures:
- Extra reinforcement in foundations
- Backfill with sandy material
- Special design to conform to the natural slope

Septic Tank Absorption Fields

Limitation rating: Severe
Limitations:
- Slow permeability

Corrective measures:
- Special design or alternate system

Local Roads and Streets

Limitation rating: Severe
Limitations:
- High shrink-swell Potential
- Low strength

Corrective measures:
- Construction on suitable subgrade or base material

EwF—Endsaw stony loam, 20 to 35 percent slopes

Setting

Landform position: Sideslopes of ridges and mountains
Size of areas: 10 to 80 acres

Typical Profile

Surface layer:
0 to 4 inches—brown stony loam

Subsoil:
4 to 36 inches—yellowish red silty clay
36 to 51 inches—yellowish red, mottled, channery silty clay

Bedrock:
51 to 72 inches—partially weathered, soft, fractured shale

Inclusions

- Carnasaw soils
- Enders soils
- Mountainburg soils

Soil Properties and Qualities

Depth class: Deep
Drainage class: Well drained
Permeability: Slow
Available water capacity: Moderate
Depth to seasonal high water table: >60 inches
Shrink-swell potential: High
Hazard of flooding: None
Surface runoff: Very high

Soil reaction: Moderately acid or strongly acid in the surface layer and strongly acid or very strongly acid in the subsoil
Parent material: Thin layer of loamy colluvium over clayey residuum weathered from acid shale

Land Use

Major Uses: Woodland

Cropland

Land capability subclass: VIIs
Suitability: Not suited
Management concerns:
- Very severe erosion hazard
- Steep slopes
- Surface stones

Pasture

Suitability: Poorly suited
Management concerns:
- Steep slopes
- Surface stones
- Very severe erosion hazard

Woodland

Woodland suitability group: 6R8
Suitability: Moderately suited
Adapted species: Loblolly pine, shortleaf pine, and southern red oak
Management concerns:
- Moderate erosion hazard
- Moderate equipment limitations due to slope, clayey subsoil, and surface stones

Management measures:
- See Woodland Management and Productivity Section (Pages 68-71)

Urban Uses

Dwellings

Limitation rating: Severe
Limitations:
- Slope
- High shrink-swell potential

Corrective measures:
- Extra reinforcement in foundations
- Backfill with sandy material
- Design to conform to the natural slope
- Landscaping

Small Commercial Buildings

Limitation rating: Severe
Limitations:
- Slope
- High shrink-swell potential

Corrective measures:
- Extra reinforcement in foundations
- Backfill with sandy material
- Design to conform to the natural slope
- Landscaping

Septic Tank Absorption Fields

Limitation rating: Severe
Limitations:
- Slope
- Slow permeability

Corrective measures:
- Special design or alternate system

Local Roads and Streets

Limitation rating: Severe
Limitations:
- Slope
- High shrink-swell potential
- Low strength

Corrective measures:
- Construction on the contour using suitable subgrade or base material

Ka—Kenn gravelly fine sandy loam, occasionally flooded

Setting

Landform position: Flood plains
Size of areas: 10 to 100 acres

Typical Profile

Surface layer:
0 to 9 inches—brown gravelly fine sandy loam

Subsoil:
9 to 17 inches—strong brown clay loam
17 to 27 inches—strong brown sandy clay loam
27 to 42 inches—brown very gravelly sandy clay loam

Substratum:
42 to 72 inches—brown extremely gravelly loam

Inclusions

- Ceda soils
- Wilburton soils
- Small areas where the surface layer is fine sandy loam or loam
- Soils similar to Kenn, except for being <40 inches to bedrock
- Small areas that are subject to frequent flooding

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: Moderate
Depth to seasonal high water table: >60 inches
Shrink-swell potential: Low
Hazard of flooding: Occasional
Surface runoff: Low - medium
Soil reaction: Slightly acid to strongly acid in the surface layer and strongly acid to very strongly acid in the subsoil
Parent material: Loamy alluvium

Land Use

Major Uses: Pasture and hayland

Cropland

Land capability subclass: IIw
Suitability: Well suited
Adapted crops: Soybeans, grain sorghum, and small grains
Management concerns:
- Occasional flooding
- Moderate erosion hazard

Management measures:
- Minimum tillage
- Crop rotation
- Cover crops

Pasture and hayland

Suitability: Well suited
Adapted plants: Tall fescue, white clover, bermudagrass, and bahiagrass
Management concerns:
- Occasional flooding

Woodland

Woodland suitability group: 8A7
Suitability: Moderately suited
Adapted species: Loblolly pine, shortleaf pine, and southern red oak
Management concerns:
- No significant limitations

Management measures:
- See Woodland Management and Productivity Section (Pages 68-71)

Urban Uses

Dwellings

Limitation rating: Severe
Limitations:
- Occasional flooding

Corrective measures:
- Inclusions above flood prone areas

Small Commercial Buildings

Limitation rating: Severe
Limitations:
- Occasional flooding

Corrective measures:
- Inclusions above flood prone areas

Septic Tank Absorption Fields

Limitation rating: Severe
Limitations:
- Occasional flooding

Corrective measures:
- Inclusions above flood prone areas

Local Roads and Streets

Limitation rating: Severe
Limitations:
- Occasional flooding

Corrective measures:
- Inclusions above flood prone areas

KC—Kenn-Ceda complex, frequently flooded

Setting

Landform position: Flood plains along streams in narrow valleys
Size of areas: 15 to 200 acres

Composition

Kenn and similar soils: 50 percent
Ceda and similar soils: 35 percent
Minor soils: 15 percent

Typical Profile

Kenn

Surface layer:
0 to 9 inches—brown gravelly fine sandy loam

Subsoil:
9 to 17 inches—strong brown clay loam
17 to 27 inches—strong brown sandy clay loam
27 to 42 inches—brown very gravelly sandy clay loam

Substratum:
42 to 72 inches—brown extremely gravelly loam

Ceda

Surface layer:
0 to 7 inches—dark grayish brown very cobbly loam

Substratum:
7 to 13 inches—dark yellowish brown very gravelly loam
13 to 72 inches—strong brown very gravelly loam

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
Permeability: Kenn—moderate; Ceda—rapid
Available water capacity: Kenn—moderate; Ceda—low
Depth to seasonal high water table: >60 inches
Shrink-swell potential: Low
Hazard of flooding: Frequent
Surface runoff: Very low - low
Soil reaction: Kenn—slightly acid to strongly acid in the surface layer and strongly acid or very strongly acid in the subsoil and substratum; Ceda—slightly acid or moderately acid
Parent material: Loamy and gravelly alluvium

Inclusions

- Spadra soils
- Wilburton soils
- Small areas with stony surface layers

Land Use

Major Uses: Woodland and pasture

Cropland

Land capability subclass: Kenn—Vw; Ceda—VIIw
Suitability: Generally not suited
Management concerns:
- Frequent flooding
- Surface cobbles and gravel

Pasture and hayland

Suitability: Moderately suited
Adapted plants: Bermudagrass, bahiagrass, tall fescue, and white clover
Management concerns:
- Frequent flooding
- Surface cobbles

Woodland

Woodland suitability group: Kenn—8W9; Ceda—7W9
Suitability: Moderately suited
Adapted species: Loblolly pine, shortleaf pine, sweetgum, and southern red oak
Management concerns:
- Severe seedling mortality

Management measures:
- See Woodland Management and Productivity Section (Pages 68-71)

Urban Use

Dwellings

Limitation rating: Severe
Limitations:
- Frequent flooding

Corrective measures:
- Locate inclusions within map unit which occur above flood prone areas

Small Commercial Buildings

Limitation rating: Severe
Limitations:
- Frequent flooding

Corrective measures:
- Locate inclusions within map unit which occur above flood prone areas

Septic Tank Absorption Fields

Limitation rating: Severe
Limitations:
- Frequent flooding

Corrective measures:
- Locate inclusions within map unit which occur above flood prone areas

Local Roads and Streets

Limitation rating: Severe
Limitations:
- Frequent flooding

Corrective measures:
- Locate inclusions within map unit which occur above flood prone areas
- Construction on a raised fill of suitable subgrade material

LvB—Leadvale silt loam, 1 to 3 percent slopes

Setting

Landform position: Broad upland valley floors
Size of areas: 10 to 400 acres

Typical Profile

Surface layer:
0 to 8 inches—brown silt loam

Subsoil:
8 to 20 inches—yellowish brown silt loam
20 to 25 inches—yellowish brown, mottled silt loam
25 to 65 inches—mottled gray, light brownish gray, and strong brown, compact and brittle, silty clay loam
65 to 72 inches—mottled yellowish brown, strong brown, and light gray silty clay loam

Inclusions

- Cane soils
- Sallisaw soils
- Taft soils
- Small areas with low mounds on the surface
- Small areas that have slopes less than 1 percent
- Small areas that have sodium in the subsoil
- Small areas of soils that are poorly drained

Soil Properties and Qualities

Depth class: Very deep to deep
Drainage class: Moderately well drained
Permeability: Moderate above the fragipan and slow in the fragipan
Available water capacity: Moderate
Depth to seasonal high water table: 1.5 to 2.5 feet
Shrink-swell potential: Low
Hazard of flooding: None
Surface runoff: Low - medium
Soil reaction: Strongly acid or very strongly acid
Parent material: Loamy material from local uplands
Other distinctive properties: Depth to fragipan ranges from 20 to 30 inches

Land Use

Major Uses: Pasture and hayland (fig. 4)

Cropland

Land capability subclass: IIe
Suitability: Well suited
Adapted crops: Soybeans, truck crops, grain sorghum, and winter small grains
Management concerns:

- Moderate erosion hazard

Figure 4.—A pasture in an area of Leadvale silt loam, 1 to 3 percent slopes.

Management measures:
- Minimum tillage
- Contour cultivation
- Terracing on long slopes
- Crop management

Pasture and hayland

Suitability: Well suited
Adapted plants: Bahiagrass, bermudagrass, tall fescue, white clover, and lespedeza
Management concerns:
- No significant limitations

Woodland

Woodland suitability group: 8D8
Suitability: Moderately suited
Adapted species: Loblolly pine, shortleaf pine, and white oak
Management concerns:
- Windthrow hazard

Management measures:
- See Woodland Management and Productivity Section (Pages 68-71)

Urban Uses

Dwellings

Limitation rating: Moderate
Limitations:
- Wetness

Corrective measures:
- Tile drains by footings
- Selective site placement
- Site shaping

Small Commercial Buildings

Limitation rating: Moderate
Limitations:
- Wetness

Corrective measures:
- Tile drains by footings
- Selective site placement
- Landscaping

Septic Tank Absorption Fields

Limitation rating: Severe
Limitations:
- Wetness
- Slow permeability

Corrective measures:
- Drainage system around filter field
- Enlargement of filter field
- Special design or alternate system

Local Roads and Streets

Limitation rating: Moderate
Limitations:
- Wetness
- Low strength

Corrective measures:
- Construction on a raised fill of suitable subgrade material
- Installation of drainage system

LvC—Leadvale silt loam, 3 to 8 percent slopes

Setting

Landform position: Broad upland valley floors and footslopes
Size of areas: 10 to 600 acres

Typical Profile

Surface layer:
0 to 8 inches—brown silt loam

Subsoil:
8 to 20 inches—yellowish brown silt loam
20 to 25 inches—yellowish brown, mottled silt loam
25 to 65 inches—mottled gray, light brownish gray, and strong brown, compact and brittle, silty clay loam
65 to 72 inches—mottled yellowish brown, strong brown, and light gray silty clay loam

Inclusions

- Cane soils
- Enders soils
- Endsaw soils
- Taft soils

Soil Properties and Qualities

Depth class: Very deep to deep
Drainage class: Moderately well drained
Permeability: Moderate above the fragipan and slow in the fragipan
Available water capacity: Moderate
Depth to seasonal high water table: 1.5 to 2.5 feet
Shrink-swell potential: Low
Hazard of flooding: None
Surface runoff: Medium - high
Soil reaction: Strongly acid or very strongly acid
Parent material: Loamy material from local uplands
Other distinctive properties: Depth to fragipan ranges from 20 to 30 inches

Land Use

Major Uses: Pasture and hayland (fig. 5)

Cropland

Land capability subclass: IIIe
Suitability: Moderately suited
Adapted crops: Soybeans, truck crops, grain sorghum, and winter small grains
Management concerns:
- Severe erosion hazard

Management measures:
- Terraces
- Contour cultivation
- Minimum tillage
- Crop residue management
- Measures need to be intensified as slope length or gradient increase

Pasture and hayland

Suitability: Well suited
Adapted plants: Bahiagrass, bermudagrass, tall fescue, white clover, sericea lespedeza, and annual lespedeza
Management concerns:
- No significant limitations

Woodland

Woodland suitability group: 8D8
Suitability: Moderately suited
Adapted species: Loblolly pine, shortleaf pine, and southern red oak
Management concerns:
- Windthrow hazard

Management measures:
- See Woodland Management and Productivity Section (Pages 68-71)

Figure 5.—Leadvale silt loam, 3 to 8 percent slopes, is well suited to pasture and hayland.

Urban Uses

Dwellings

Limitation rating: Moderate
Limitations:
- Wetness

Corrective measures:
- Tile drains by footings
- Selective placement of site
- Shaping of site

Small Commercial Buildings

Limitation rating: Moderate
Limitations:
- Wetness
- Slope

Corrective measures:
- Tile drains by footings
- Selective placement of site
- Shaping of site
- Special design to conform to the natural slope

Septic Tank Absorption Fields

Limitation rating: Severe
Limitations:
- Wetness
- Slow permeability

Corrective measures:
- Drainage system around filter field
- Enlargement of filter field area
- Special design or alternate system

Local Roads and Streets

Limitation rating: Moderate
Limitations:
- Wetness
- Low strength

Corrective measures:
- Installation of drainage system
- Construction on a raised fill of suitable subgrade material

LMC—Linker-Mountainburg complex, 3 to 8 percent slopes

Setting

Landform position: Tops of ridges and mountains
Size of areas: 10 to 400 acres

Composition

Linker and similar soils: 65 percent
Mountainburg and similar soils: 25 percent
Minor soils: 10 percent

Typical Profile

Linker

Surface layer:
0 to 6 inches—brown gravelly fine sandy loam

Subsoil:
6 to 13 inches—yellowish red fine sandy loam
13 to 28 inches—yellowish red sandy clay loam

Bedrock:
28 to 36 inches—hard, level-bedded sandstone

Mountainburg

Surface layer:
0 to 4 inches—dark brown stony fine sandy loam

Subsoil:
4 to 9 inches—strong brown gravelly fine sandy loam
9 to 16 inches—yellowish red very gravelly sandy clay loam

Bedrock:
16 to 20 inches—hard, level-bedded sandstone

Soil Properties and Qualities

Depth class: Linker—moderately deep; Mountainburg—shallow
Drainage class: Well drained
Permeability: Linker—moderate; Mountainburg—moderately rapid
Available water capacity: Linker—low; Mountainburg—very low
Depth to seasonal high water table: >60 inches
Shrink-swell potential: Low
Hazard of flooding: None
Surface runoff: Medium - high
Soil reaction: Linker—strongly acid or very strongly acid; Mountainburg—moderately acid or strongly acid in the surface and subsurface layers and strongly acid or very strongly acid in the subsoil
Parent material: Linker—loamy residuum from sandstone; Mountainburg—loamy and gravelly residuum from sandstone
Depth to bedrock: Linker—20 to 40 inches; Mountainburg—10 to 20 inches

Inclusions

- Enders soils
- Nella soils
- Small areas similar to Linker which are deeper than 40 inches to bedrock
- Small areas of rock outcrop

Land Use

Major Uses: Pasture and woodland

Cropland

Land capability subclass: Linker—IIIe; Mountainburg—VIs
Suitability: Generally not suited due to intermingled areas with stones on the surface
Management concerns:
- Surface stones
- Slope
- Very severe erosion hazard

Pasture and hayland

Suitability: Linker—moderately suited; Mountainburg—poorly suited
Adapted plants: Bermudagrass, bahiagrass, clover, lespedeza, and tall fescue
Management concerns:
- Low fertility levels
- Surface stones
- Droughtiness

Management measures:
- Proper stocking rates
- Rotation grazing
- Maintain fertility levels
- Weed and brush control

Woodland

Woodland suitability group: Linker—6D8; Mountainburg—5D3
Suitability: Linker—moderately suited; Mountainburg—poorly suited
Adapted species: Shortleaf pine, loblolly pine, eastern red cedar, and southern red oak
Management concerns:
- Linker—moderate windthrow hazard
- Mountainburg—moderate equipment limitations, moderate seedling mortality, and severe windthrow hazard

Management measures:
- See Woodland Management and Productivity Section (Pages 68-71)

Urban Uses

Dwellings

Limitation rating: Linker—moderate; Mountainburg—severe
Limitations:
- Linker—moderate depth to rock
- Mountainburg—shallow depth to rock and large stones

Corrective measures:
- Locate inclusions of deeper areas
- Build above bedrock and landscape with additional fill
- Avoid areas with shallow depth to rock and large surface stones

Small Commercial Buildings

Limitation rating: Linker—moderate; Mountainburg—severe
Limitations:
- Linker—moderate depth to rock and slope
- Mountainburg—shallow depth to rock and large stones

Corrective measures:
- Locate inclusions of deeper areas
- Build above bedrock and landscape with additional fill
- Avoid areas with shallow depth to rock and large surface stones
- Slope—design to conform to the natural contour

Septic Tank Absorption Fields

Limitation rating: Severe
Limitations:
- Linker—moderate depth to rock
- Mountainburg—shallow depth to rock and large stones

Corrective measures:
- Special design or alternate system
- Inclusions within map unit which are better suited

Local Roads and Streets

Limitation rating: Linker—moderate; Mountainburg—severe
Limitations:
- Linker—moderate depth to rock
- Mountainburg—shallow depth to rock and large stones

Corrective measures:
- Plan grades and locations to avoid removal of bedrock and large stones
- Blasting of rock may be necessary in some areas

Na—Neff silt loam, occasionally flooded

Setting

Landform position: Flood plains
Size of areas: 50 to 400 acres

Typical Profile

Surface layer:
0 to 13 inches—brown silt loam

Subsoil:
13 to 24 inches—brown, mottled silt loam
24 to 37 inches—dark grayish brown, mottled silt loam
37 to 59 inches—brown, mottled silty clay loam
59 to 72 inches—yellowish brown, mottled silt loam

Inclusions

- Cupco soils
- Kenn soils

- Rexor soils
- Spadra soils
- Areas that are subject to frequent flooding
- Small areas of soils that are poorly drained

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderately slow
Available water capacity: High
Depth to seasonal high water table: 1 to 2 feet
Shrink-swell potential: Low
Hazard of flooding: Occasional
Surface runoff: Low
Soil reaction: Moderately acid to very strongly acid
Parent material: Loamy alluvium

Land Use

Major Uses: Pasture and hayland

Cropland

Land capability subclass: IIw
Suitability: Well suited
Adapted crops: Soybeans, truck crops, grain sorghum, and winter small grains
Management concerns:
- Excess water
- Occasional flooding

Management measures:
- Surface drainage
- Crop residue management

Pasture and hayland

Suitability: Well suited
Adapted plants: Bahiagrass, bermudagrass, tall fescue, white clover, and lespedeza
Management concerns:
- Occasional flooding

Management measures:
- Proper stocking rates
- Rotation grazing
- Weed and brush control

Woodland

Woodland suitability group: 9W8
Suitability: Well suited
Adapted species: Sweetgum, eastern cottonwood, loblolly pine, and shortleaf pine
Management concerns:
- Moderate seedling mortality due to flooding
- Moderate equipment limitations due to wetness

Management measures:
- See Woodland Management and Productivity Section (Pages 68-71)

Urban Uses

Dwellings

Limitation rating: Severe
Limitations:
- Occasional flooding
- Wetness

Corrective measures:
- Inclusions above flood prone areas or other sites

Small Commercial Buildings

Limitation rating: Severe
Limitations:
- Occasional flooding
- Wetness

Corrective measures:
- Inclusions above flood prone areas or other sites

Septic Tank Absorption Fields

Limitation rating: Severe
Limitations:
- Occasional flooding
- Wetness
- Moderately slow permeability

Corrective measures:
- Inclusions above flood prone areas
- Increase size of filter field area

Local Roads and Streets

Limitation rating: Severe
Limitations:
- Occasional flooding
- Wetness

Corrective measures:
- Inclusions above flood prone areas or other sites

NeC—Nella gravelly fine sandy loam, 3 to 8 percent slopes

Setting

Landform position: Footslopes, benches, and sideslopes of ridges and mountains
Size of areas: 10 to 200 acres

Typical Profile

Surface layer:
0 to 4 inches—dark grayish brown gravelly fine sandy loam

Subsurface layer:
4 to 8 inches—brown gravelly fine sandy loam

Subsoil:
8 to 15 inches—strong brown gravelly loam

15 to 30 inches—yellowish red clay loam
30 to 52 inches—red clay loam
52 to 72 inches—red cobbly clay loam

Inclusions

- Enders soils
- Linker soils
- Mountainburg soils
- Small areas with fine sandy loam or stony surface layers

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: Moderate
Depth to seasonal high water table: >60 inches
Shrink-swell potential: Low
Hazard of flooding: None
Surface runoff: Medium
Soil reaction: Strongly acid or very strongly acid
Parent material: Colluvium and residuum from acid sandstone and shale

Land Use

Major Uses: Pasture and hayland

Cropland

Land capability subclass: IIIe
Suitability: Moderately suited
Adapted crops: Grain sorghum, small grains, and soybeans
Management concerns:
- Severe erosion hazard

Management measures:
- Minimum tillage
- Crop rotation
- Terracing
- Crop residue management
- Measures need to be intensified as slope length and gradient increase

Pasture and hayland

Suitability: Well suited
Adapted plants: Bermudagrass, bahiagrass, white clover, and lespedeza
Management concerns:
- Low fertility levels

Management measures:
- Proper stocking rates
- Rotation grazing
- Maintaining fertility levels
- Weed and brush control

Woodland

Woodland suitability group: 8A7
Suitability: Moderately suited
Adapted species: Shortleaf pine, loblolly pine, and northern red oak
Management concerns:
- No significant limitations

Management measures:
- See Woodland Management and Productivity Section (Pages 68-71)

Urban Uses

Dwellings

Limitation rating: Slight
Limitations:
- No significant limitations

Small Commercial Buildings

Limitation rating: Moderate
Limitations:
- Slope

Corrective measures:
- Special design that conforms to natural contour

Septic Tank Absorption Fields

Limitation rating: Moderate
Limitations:
- Moderate permeability

Corrective measures:
- Increase absorption field size

Local Roads and Streets

Limitation rating: Slight
Limitations:
- No significant limitations

NEE—Nella-Enders complex, 8 to 20 percent slopes

Setting

Landform position: Sideslopes and footslopes of ridges and mountains
Size of areas: 50 to 600 acres

Composition

Nella and similar soils: 60 percent
Enders and similar soils: 25 percent
Minor soils: 15 percent

Typical Profile

Nella

Surface layer:
0 to 4 inches—dark grayish brown cobbly fine sandy loam

Subsurface layer:
4 to 8 inches—brown cobbly fine sandy loam

Subsoil:
8 to 15 inches—strong brown gravelly loam
15 to 30 inches—yellowish red clay loam
30 to 52 inches—red clay loam
52 to 72 inches—red cobbly clay loam

Enders

Surface layer:
0 to 4 inches—dark brown cobbly silt loam

Subsoil:
4 to 9 inches—strong brown loam
9 to 45 inches—yellowish red, mottled silty clay
45 to 57 inches—mottled yellowish brown, yellowish red, and light gray channery silty clay

Bedrock:
57 to 60 inches—soft, weathered, level-bedded shale

Soil Properties and Qualities

Depth class: Nella—very deep; Enders—deep
Drainage class: Well drained
Permeability: Nella—moderate; Enders—very slow
Available water capacity: Moderate
Depth to seasonal high water table: >60 inches
Shrink-swell potential: Nella—low; Enders—high
Hazard of flooding: None
Surface runoff: Medium - high
Soil reaction: Nella—strongly acid or very strongly acid; Enders—strongly acid to extremely acid
Parent material: Nella—loamy colluvium and residuum from sandstone and shale; Enders—thin layer of loamy colluvium over clayey residuum from shale
Depth to bedrock: Nella—>60 inches; Enders—40 to 60 inches

Inclusions

- Linker soils
- Mountainburg soils
- Small areas with gravelly or stony surface layers
- Small areas of rock outcrop

Land Use

Major Uses: Woodland

Cropland

Land capability subclass: VIs
Suitability: Not suited
Management concerns:
- Surface cobbles
- Slope
- Very severe erosion hazard

Pasture and hayland

Suitability: Poorly suited
Adapted plants: Bermudagrass, bahiagrass, lespedeza, and tall fescue
Management concerns:
- Low fertility levels
- Surface cobbles
- Slope

Management measures:
- Proper stocking rates
- Rotation grazing
- Maintain fertility levels
- Weed and brush control

Woodland

Woodland suitability group: Nella—8A7; Enders—6C8
Suitability: Moderately suited
Adapted species: Shortleaf pine, loblolly pine, and southern red oak
Management concerns:
- Nella—no significant limitations
- Enders—moderate equipment limitations

Management measures:
- See Woodland Management and Productivity Section (Pages 68-71)

Urban Uses

Dwellings

Limitation rating: Nella—moderate; Enders—severe
Limitations:
- Nella—slope
- Enders—high shrink-swell potential

Corrective measures:
- High shrink-swell potential—extra reinforcement in foundations and backfill with sandy material
- Slope—design to conform to the natural contour

Small Commercial Buildings

Limitation rating: Severe
Limitations:
- Nella—slope
- Enders—high shrink-swell potential and slope

Corrective measures:
- High shrink-swell potential—extra reinforcement in foundations and backfill with sandy material
- Slope—design to conform to the natural contour

Septic Tank Absorption Fields

Limitation rating: Nella—moderate; Enders—severe
Limitations:
- Nella—moderate permeability
- Enders—very slow permeability

Corrective measures:
- Enlarge absorption field area
- Special design or alternate system
- Inclusions within map unit which are better suited

Local Roads and Streets

Limitation rating: Nella—moderate; Enders—severe
Limitations:
- Nella—slope
- Enders—high shrink-swell potential

Corrective measures:
- High shrink-swell potential—add fill of suitable subgrade to road bed
- Slope—design to conform to the natural contour

NEF—Nella-Enders complex, 20 to 40 percent slopes

Setting

Landform position: Sideslopes of ridges and mountains
Size of areas: 50 to 1,000 acres

Composition

Nella and similar soils: 70 percent
Enders and similar soils: 20 percent
Minor soils: 10 percent

Typical Profile

Nella

Surface layer:
0 to 4 inches—dark grayish brown stony fine sandy loam

Subsurface layer:
4 to 8 inches—brown stony fine sandy loam

Subsoil:
8 to 15 inches—strong brown cobbly loam
15 to 30 inches—yellowish red clay loam
30 to 52 inches—red clay loam
52 to 72 inches—red cobbly clay loam

Enders

Surface layer:
0 to 4 inches—dark brown stony silt loam

Subsoil:
4 to 9 inches—strong brown stony loam
9 to 45 inches—yellowish red, mottled silty clay
45 to 57 inches—mottled yellowish brown, yellowish red, and light gray channery silty clay

Bedrock:
57 to 60 inches—soft, weathered, level-bedded shale

Soil Properties and Qualities

Depth class: Nella—very deep; Enders—deep
Drainage class: Well drained
Permeability: Nella—moderate; Enders—very slow
Available water capacity: Moderate
Depth to seasonal high water table: >60 inches
Shrink-swell potential: Nella—low; Enders—high
Hazard of flooding: None
Surface runoff: High - very high
Soil reaction: Nella—strongly acid or very strongly acid; Enders—strongly acid to extremely acid
Parent material: Nella—loamy colluvium and residuum from sandstone and shale; Enders—thin layer of loamy colluvium over clayey residuum from shale
Depth to bedrock: Nella—>60 inches; Enders—40 to 60 inches

Inclusions

- Linker soils
- Mountainburg soils
- Small areas with gravelly or very stony surface layers
- Small areas of rock outcrop

Land Use

Major Uses: Woodland

Cropland

Land capability subclass: VIIs
Suitability: Not suited
Management concerns:
- Surface stones
- Steep slopes
- Very severe erosion hazard

Pasture and hayland

Suitability: Poorly suited to not suited
Adapted plants: Fescue and native grasses
Management concerns:
- Low fertility levels
- Surface stones
- Steep slopes

Management measures:
- Proper stocking rates
- Rotation grazing
- Maintain fertility levels
- Weed and brush control

Woodland

Woodland suitability group: Nella—8R8; Enders—6R8
Suitability: Moderately suited
Adapted species: Shortleaf pine, loblolly pine, and southern red oak
Management concerns:
- Moderate equipment limitations and moderate erosion hazard

Management measures:
• See Woodland Management and Productivity Section (Pages 68-71)

Urban Uses

Dwellings

Limitation rating: Severe
Limitations:
• Nella—slope
• Enders—high shrink-swell potential and slope
Corrective measures:
• High shrink-swell potential—extra reinforcement in foundations and backfill with sandy material
• Slope—design to conform to the natural contour

Small Commercial Buildings

Limitation rating: Severe
Limitations:
• Nella—slope
• Enders—high shrink-swell potential and slope
Corrective measures:
• High shrink-swell potential—extra reinforcement in foundations and backfill with sandy material
• Slope—design to conform to the natural contour

Septic Tank Absorption Fields

Limitation rating: Severe
Limitations:
• Nella—moderate permeability and slope
• Enders—very slow permeability and slope
Corrective measures:
• Enlarge absorption field area
• Special design or alternate system
• Inclusions within map unit which are better suited

Local Roads and Streets

Limitation rating: Severe
Limitations:
• Nella—slope
• Enders—high shrink-swell potential and slope
Corrective measures:
• High shrink-swell potential—add fill of suitable subgrade to road bed
• Slope—design to conform to the natural contour

OCG—Octavia-Carnasaw-Caston complex, 35 to 60 percent slopes

Setting

Landform position: Benches and sideslopes of ridges and mountains
Size of areas: 40 to 400 acres

Composition

Octavia and similar soils: 50 percent
Carnasaw and similar soils: 25 percent
Caston and similar soils: 15 percent
Minor soils: 10 percent

Typical Profile

Octavia

Surface layer:
0 to 4 inches—dark grayish brown very stony loam

Subsurface layer:
4 to 8 inches—yellowish brown cobbly loam

Subsoil:
8 to 13 inches—strong brown loam
13 to 41 inches—yellowish red clay loam
41 to 72 inches—mottled yellowish red, red, and gray clay

Carnasaw

Surface layer:
0 to 4 inches—very dark grayish brown very stony silt loam

Subsurface layer:
4 to 11 inches—yellowish brown cobbly silt loam

Subsoil:
11 to 27 inches—yellowish red clay
27 to 40 inches—red, mottled clay
40 to 50 inches—mottled red and gray channery clay
50 to 58 inches—mottled strong brown and gray channery silty clay

Bedrock:
58 to 60 inches—fractured and tilted, soft shale with lenses of sandstone

Caston

Surface layer:
0 to 4 inches—brown very stony fine sandy loam

Subsurface layer:
4 to 9 inches—brown very cobbly fine sandy loam

Subsoil:
9 to 21 inches—strong brown very gravelly loam
21 to 43 inches—yellowish red very gravelly sandy clay loam
43 to 72 inches—yellowish red extremely gravelly clay loam

Soil Properties and Qualities

Depth class: Caston and Octavia—very deep; Carnasaw—deep
Drainage class: Well drained

Permeability: Octavia—moderately slow; Carnasaw—slow; Caston—moderate
Available water capacity: Moderate - low
Depth to seasonal high water table: >60 inches
Shrink-swell potential: Caston and Octavia—low; Carnasaw—high
Hazard of flooding: None
Surface runoff: Very high
Soil reaction: Moderately acid or strongly acid in the surface and subsurface layers and strongly acid or very strongly acid in the subsoil
Parent material: Octavia—loamy colluvium over clayey residuum; Carnasaw—clayey residuum from shale; Caston—loamy colluvium
Depth to bedrock: Caston and Octavia—> 60 inches; Carnasaw—40 to 60 inches

Inclusions

- Sherless soils
- Small areas of rock outcrop
- Small areas with gravelly or cobbly surface layers

Land Use

Major Uses: Woodland

Cropland

Land capability subclass: VIIs
Suitability: Not suited
Management concerns:
- Very steep slopes
- Very severe erosion hazard
- Very stony surface

Pasture and hayland

Suitability: Not suited
Management concerns:
- Very steep slopes
- Very stony surface

Woodland

Woodland suitability group: 6R9
Suitability:
- Moderately suited

Adapted species: Loblolly pine, shortleaf pine, and southern red oak
Management concerns:
- Severe erosion hazard
- Severe equipment limitations
- Moderate seedling mortality

Management measures:
- See Woodland Management and Productivity Section (Pages 68-71)

Urban Uses

Dwellings

Limitation rating: Severe
Limitations:
- Very steep slopes
- Very stony surface
- Carnasaw—high shrink-swell potential

Corrective measures:
- Limitations are usually difficult or impractical to overcome

Small Commercial Buildings

Limitation rating: Severe
Limitations:
- Very steep slopes
- Very stony surface
- Carnasaw—high shrink-swell potential

Corrective measures:
- Limitations are usually difficult or impractical to overcome

Septic Tank Absorption Fields

Limitation rating: Severe
Limitations:
- Very steep slopes
- Very stony surface
- Carnasaw and Octavia—slow or moderately slow permeability

Corrective measures:
- Limitations are usually difficult or impractical to overcome

Local Roads and Streets

Limitation rating: Severe
Limitations:
- Very steep slopes
- Very stony surface
- Carnasaw—high shrink-swell potential

Corrective measures:
- Limitations are usually difficult or impractical to overcome

Rx—Rexor loam, frequently flooded

Setting

Landform position: Flood plains of larger streams
Size of areas: 10 to 150 acres

Typical Profile

Surface layer:
0 to 7 inches—Brown loam

Subsoil:
7 to 37 inches—brown silty clay loam
37 to 49 inches—brown, mottled silty clay loam
49 to 72 inches—brown, mottled silt loam

Inclusions

- Neff soils
- Spadra soils

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: High
Depth to seasonal high water table: 3 to 5 feet
Shrink-swell potential: Low
Hazard of flooding: Frequent
Surface runoff: Low - medium
Soil reaction: Slightly acid to strongly acid in the surface layer and moderately acid to very strongly acid in the subsoil
Parent material: Loamy alluvium

Land Use

Major Uses: Pasture and woodland

Cropland

Land capability subclass: IVw
Suitability: Poorly suited

Pasture and hayland

Suitability: Moderately suited
Adapted plants: Tall fescue, white clover, bermudagrass, and bahiagrass
Management concerns:
- Frequent flooding may delay haying operations and other management practices

Management measures:
- Proper stocking rates
- Rotation grazing
- Weed and brush control

Woodland

Woodland suitability group: 9W9
Suitability: Well suited
Adapted species: Shortleaf pine, loblolly pine, and southern red oak
Management concerns:
- Seedling mortality due to frequent flooding

Management measures:
- See Woodland Management and Productivity Section (Pages 68-71)

Urban Uses

Dwellings

Limitation rating: Severe
Limitations:
- Frequent flooding
- *Corrective measures:*
- Inclusions above flood prone areas or other sites

Small Commercial Buildings

Limitation rating: Severe
Limitations:
- Frequent flooding

Corrective measures:
- Inclusions above flood prone areas or other sites

Septic Tank Absorption Fields

Limitation rating: Severe
Limitations:
- Wetness
- Frequent flooding

Corrective measures:
- Inclusions above flood prone areas or other sites

Local Roads and Streets

Limitation rating: Severe
Limitations:
- Frequent flooding
- Low strength

Corrective measures:
- Inclusions above flood prone areas or other sites
- Construction on a raised bed of suitable subgrade material

SaB—Sallisaw silt loam, 0 to 3 percent slopes

Setting

Landform position: Broad upland valleys
Size of areas: 10 to 200 acres

Typical Profile

Surface layer:
0 to 5 inches—brown silt loam

Subsoil:
5 to 13 inches—yellowish red loam
13 to 22 inches—red loam
22 to 34 inches—red, mottled clay loam
34 to 49 inches—mottled red, strong brown, and pale brown clay loam
49 to 60 inches—mottled red, light brownish gray, and strong brown very gravelly clay loam

60 to 72 inches—mottled strong brown, light brownish gray, and red very gravelly clay loam

Inclusions

- Leadvale soils

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: Moderate
Depth to seasonal high water table: >60 inches
Shrink-swell potential: Low
Hazard of flooding: None
Surface runoff: Low - medium
Soil reaction: Slightly acid or moderately acid in the surface layer and strongly acid or very strongly acid in the subsoil
Parent material: Loamy valley fill

Land Use

Major Uses: Pasture and hayland

Cropland

Land capability subclass: IIe
Suitability: Well suited
Adapted crops: Soybeans, truck crops, grain sorghum, and small grains
Management concerns:
- Moderate erosion hazard

Management measures:
- Minimum tillage
- Contour cultivation
- Terracing on long slopes
- Crop residue management

Pasture and hayland

Suitability: Well suited
Adapted plants: Bahiagrass, bermudagrass, tall fescue, white clover, and lespedeza
Management concerns:
- No significant limitations

Woodland

Woodland suitability group: 7A7
Suitability: Moderately suited
Adapted species: Loblolly pine, shortleaf pine, and southern red oak
Management concerns:
- No significant limitations

Management measures:
- See Woodland Management and Productivity Section (Pages 68-71)

Urban Uses

Dwellings

Limitation rating: Slight
Limitations:
- No significant limitations

Small Commercial Buildings

Limitation rating: Slight
Limitations:
- No significant limitations

Septic Tank Absorption Fields

Limitation rating: Moderate
Limitations:
- Moderate permeability

Corrective measures:
- Increase size of absorption field

Local Roads and Streets

Limitation rating: Slight
Limitations:
- No significant limitations

SaC—Sallisaw silt loam, 3 to 8 percent slopes

Setting

Landform position: Broad upland valleys
Size of areas: 10 to 200 acres

Typical Profile

Surface layer:
0 to 5 inches—brown silt loam

Subsoil:
5 to 13 inches—yellowish red loam
13 to 22 inches—red loam
22 to 34 inches—red, mottled clay loam
34 to 49 inches—mottled red, strong brown, and pale brown clay loam
49 to 60 inches—mottled red, light brownish gray, and strong brown very gravelly clay loam
60 to 72 inches—mottled strong brown, light brownish gray, and red very gravelly clay loam

Inclusions

- Leadvale soils

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate

Available water capacity: Moderate
Depth to seasonal high water table: >60 inches
Shrink-swell potential: Low
Hazard of flooding: None
Surface runoff: Medium
Soil reaction: Slightly acid or moderately acid in the surface layer and strongly acid or very strongly acid in the subsoil
Parent material: Loamy valley fill

Land Use

Major Uses: Pasture and hayland (fig. 6)

Cropland

Land capability subclass: IIIe
Suitability: Moderately suited
Adapted crops: Grain sorghum, small grains, and soybeans
Management concerns:
- Severe erosion hazard

Management measures:
- Minimum tillage
- Contour cultivation
- Crop rotation and terracing on steeper slopes
- Crop residue management

Figure 6.—Sallisaw silt loam, 3 to 8 percent slopes, is well suited to pasture and hayland.

Figure 7.—A good stand of shortleaf pine trees in an area of Sallisaw silt loam, 3 to 8 percent slopes.

• Measures need to be intensified as slope length and gradient increase

Pasture and hayland

Suitability: Well suited
Adapted plants: Bermudagrass, white clover, and lespedeza
Management concerns:
• No significant limitations

Woodland

Woodland suitability group: 7A7
Suitability: Moderately suited
Adapted species: Loblolly pine, shortleaf pine, and southern red oak (fig. 7)
Management concerns:
• No significant limitations

Management measures:
• See Woodland Management and Productivity Section (Pages 68-71)

Urban Uses

Dwellings

Limitation rating: Slight
Limitations:
• No significant limitations

Small Commercial Buildings

Limitation rating: Moderate
Limitations:
• Slope
Corrective measures:
• Special design to conform to the natural contour

Septic Tank Absorption Fields

Limitation rating: Moderate
Limitations:
• Moderate permeability
Corrective measures:
• Increase size of absorption field
• Special design or alternate system

Local Roads and Streets

Limitation rating: Slight
Limitations:
• No significant limitations

Sp—Spadra fine sandy loam, occasionally flooded

Setting

Landform position: Low stream terraces
Size of areas: 10 to 500 acres

Typical Profile

Surface layer:
0 to 8 inches—brown fine sandy loam

Subsoil:
8 to 15 inches—yellowish red loam
15 to 38 inches—yellowish red sandy clay loam
38 to 54 inches—strong brown fine sandy loam

Substratum:
54 to 72 inches—yellowish brown gravelly loam

Inclusions

• Cupco soils
• Neff soils
• Areas subject to frequent flooding

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: High
Depth to seasonal high water table: >60 inches
Shrink-swell potential: Low
Hazard of flooding: Occasional
Surface runoff: Low - medium
Soil reaction: Moderately acid to very strongly acid
Parent material: Loamy alluvium

Land Use

Major Uses: Pasture and hayland (fig. 8)

Cropland

Land capability subclass: IIw
Suitability: Well suited
Adapted crops: Soybeans, grain sorghum, and small grains
Management concerns:
• Occasional flooding
• Slight to moderate erosion hazard
Management measures:
• Minimum tillage
• Crop rotation
• Crop residue management

Pasture and hayland

Suitability: Well suited
Adapted plants: Tall fescue, white clover, bermudagrass, and bahiagrass
Management concerns:
• No significant limitations

Woodland

Woodland suitability group: 10A7
Suitability: Well suited
Adapted species: Shortleaf pine, loblolly pine, and southern red oak
Management concerns:
• No significant limitations
Management measures:
• See Woodland Management and Productivity Section (Pages 68-71)

Urban Uses

Dwellings

Limitation rating: Severe
Limitations:
• Occasional flooding
Corrective measures:
• Inclusions above flood prone areas or other sites

Figure 8.—Spadra fine sandy loam, occasionally flooded, is well suited to pasture and hayland.

Small Commercial Buildings

Limitation rating: Severe
Limitations:
- Occasional flooding

Corrective measures:
- Inclusions above f ood prone areas or other sites

Septic Tank Absorption Fields

Limitation rating: Severe
Limitations:
- Occasional flooding

Corrective measures:
- Inclusions above flood prone areas or other sites

Local Roads and Streets

Limitation rating: Severe
Limitations:
- Occasional flooding
- *Corrective measures:*
- Inclusions above flood prone areas or other sites
- Construction on a raised bed of suitable subgrade material

Ta—Taft silt loam, 0 to 2 percent slopes

Setting

Landform position: Broad upland valley floors
Size of areas: 10 to 400 acres

Typical Profile

Surface layer:
0 to 7 inches—dark grayish brown silt loam

Subsoil:
7 to 20 inches—yellowish brown, mottled silt loam
20 to 24 inches—grayish brown, mottled silt loam
24 to 58 inches—mottled yellowish brown and light gray firm, compact, and brittle silty clay loam with veins of gray silt loam
58 to 72 inches—light yellowish brown, mottled silty clay loam with iron depletions

Inclusions

- Cane soils
- Leadvale soils
- Small areas with low mounds
- Small areas that have sodium in the subsoil
- Small areas of soils that are poorly drained

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Slow
Available water capacity: Moderate
Depth to seasonal high water table: 1 to 2 feet
Shrink-swell potential: Low
Hazard of flooding: None
Surface runoff: Low - medium
Soil reaction: Strongly acid or very strongly acid
Parent material: Loamy sediments derived from interbedded sandstone and shale
Other distinctive properties: Depth to fragipan ranges from 18 to 30 inches

Land Use

Major Uses: Pasture

Cropland

Land capability subclass: IIIw
Suitability: Moderately suited
Adapted crops: Soybeans, grain sorghum, and winter small grains
Management concerns:
- Excess surface water

Management measures:
- Adequate surface drainage
- Minimum tillage
- Crop residue management

Pasture

Suitability: Moderately suited
Adapted plants: Bermudagrass, tall fescue, white clover, bahiagrass, and lespedeza
Management concerns:
- Seasonal wetness

Management measures:
- Adequate surface drainage
- Proper stocking rates
- Rotation grazing
- Weed and brush control

Woodland

Woodland suitability group: 6W8
Suitability: Moderately suited
Adapted species: Loblolly pine, shortleaf pine, white oak, and sweetgum
Management concerns:
- Moderate equipment limitation
- Moderate windthrow hazard
- Moderate seedling mortality

Management measures:
- See Woodland Management and Productivity Section (Pages 68-71)

Urban Uses

Dwellings

Limitation rating: Severe
Limitations:
- Wetness

Corrective measures:
- Tile drains by footings
- Shaping of site

Small Commercial Buildings

Limitation rating: Severe
Limitations:
- Wetness

Corrective measures:
- Tile drains by footings
- Shaping of site

Septic Tank Absorption Fields

Limitation rating: Severe
Limitations:
- Wetness
- Slow permeability

Corrective measures:
- Diversions to intercept water from higher places
- Drainage system around filter field
- Special design or alternate system

Local Roads and Streets

Limitation rating: Severe
Limitations:
- Low strength
- Wetness

Corrective measures:
- Construction on a raised fill of suitable subgrade or base material

Tf—Taft silt loam, mounded

Setting

Landform position: Broad upland valley floors
Size of areas: 10 to 300 acres

Typical Profile

Surface layer:
0 to 7 inches—dark grayish brown silt loam

Subsoil:
7 to 20 inches—yellowish brown, mottled silt loam
20 to 24 inches—grayish brown, mottled silt loam
24 to 58 inches—mottled yellowish brown and light gray firm, compact, and brittle silty clay loam with veins of gray silt loam
58 to 72 inches—light yellowish brown, mottled silty clay loam

Inclusions

- Leadvale soils
- Small areas with no mounds
- Small areas that have sodium in the subsoil
- Small areas of soils that are poorly drained

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Slow
Available water capacity: Moderate
Depth to seasonal high water table: 1 to 2 feet
Shrink-swell potential: Low
Hazard of flooding: None
Surface runoff: Low - medium
Soil reaction: Strongly acid or very strongly acid
Parent material: Loamy sediments derived from interbedded sandstone and shale
Other distinctive properties: Depth to fragipan ranges from 18 to 30 inches

Land Use

Major Uses: Pasture

Cropland

Land capability subclass: IIIw
Suitability: Moderately suited
Adapted crops: Soybeans, grain sorghum, and winter small grains
Management concerns:
- Excess surface water

Management measures:
- Adequate surface drainage
- Minimum tillage
- Crop residue management

Pasture and hayland

Suitability: Moderately suited
Adapted plants: Bermudagrass, tall fescue, white clover, bahiagrass, and lespedeza
Management concerns:
- Seasonal wetness

Management measures:
- Adequate surface drainage
- Proper stocking rates
- Rotation grazing
- Weed and brush control

Woodland

Woodland suitability group: 6W8
Suitability: Moderately suited
Adapted species: Loblolly pine, shortleaf pine, white oak, and sweetgum
Management concerns:
- Moderate equipment limitation
- Moderate windthrow hazard
- Moderate seedling mortality

Management measures:
- See Woodland Management and Productivity Section (Pages 68-71)

Urban Uses

Dwellings

Limitation rating: Severe
Limitations:
- Wetness

Corrective measures:
- Tile drains by footings
- Shaping of site

Small Commercial Buildings

Limitation rating: Severe
Limitations:
- Wetness

Corrective measures:
- Tile drains by footings
- Shaping of site

Septic Tank Absorption Fields

Limitation rating: Severe
Limitations:
- Wetness
- Slow permeability

Corrective measures:
- Diversions to intercept water from higher places
- Drainage system around filter field
- Special design or alternate system

Local Roads and Streets

Limitation rating: Severe
Limitations:
- Low strength
- Wetness

Corrective measures:
- Construction on a raised fill of suitable subgrade or base material

Ud—Udorthents, 3 to 65 percent slopes, channery

Setting

Landform position: Spoil from strip mines
Size of areas: 10 to 50 acres

Typical Profile

These soils have been altered, mixed, and obscured by mining operations. Texture ranges from channery silt loam to extremely channery silty clay loam with no definite arrangement into layers because of the mixing during mining operations. The content of coarse fragments ranges from about 15 to 90 percent.

Inclusions

- Coal pits
- Abandoned pits containing water
- Leadvale soils
- Sallisaw soils

Soil Properties and Qualities

Permeability: Moderate to rapid
Available water capacity: Low
Surface runoff: Medium - very high
Soil reaction: Strongly acid to extremely acid

Land Use

Cropland

Land capability subclass: None assigned
Suitability: Not suited

Pasture and hayland

Suitability: Poorly suited to not suited
Adapted plants: Bermudagrass, bahiagrass, annual lespedeza, and sericea lespedeza
Management concerns:
- Coarse fragments
- Low available water capacity
- Very severe erosion hazard
- Droughtiness

Woodland

Woodland suitability group: None assigned
Suitability: Poorly suited
Adapted species: Loblolly pine and shortleaf pine
Management concerns:
- Seedling mortality
- Severe erosion hazard
- Moderate to severe equipment limitations

Management measures:
- See Woodland Management and Productivity Section (Pages 68-71)

Urban Uses

Unsmoothed areas have severe limitations for most urban uses. Smoothed areas generally have moderate to severe limitations depending on slope.

WbC—Wilburton very cobbly loam, 1 to 8 percent slopes

Setting

Landform position: Upland valleys of the Ouachita Mountains
Size of areas: 50 to 150 acres

Typical Profile

Surface layer:
0 to 7 inches—brown very cobbly loam

Subsoil:
7 to 15 inches—brown very cobbly loam
15 to 24 inches—yellowish red very cobbly loam
24 to 38 inches—yellowish red very cobbly sandy clay loam
38 to 53 inches—strong brown extremely cobbly sandy clay loam

Substratum:
53 to 72 inches—strong brown extremely cobbly loam

Inclusions

- Avilla soils
- Ceda soils
- Kenn soils
- Small areas with a stony or very stony surface layer

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: Low
Depth to seasonal high water table: >60 inches
Shrink-swell potential: Low

Hazard of flooding: None
Surface runoff: Low - medium
Soil reaction: Moderately acid or strongly acid in the surface layer and upper subsoil and strongly acid or very strongly acid in the lower subsoil
Parent material: Loamy, gravelly, and cobbly sediments

Land Use

Major Uses: Woodland

Cropland

Land capability subclass: IVs
Suitability: Poorly suited
Management concerns:
- Very severe erosion hazard
- Surface cobbles

Pasture and hayland

Suitability: Poorly suited
Adapted plants: Bahiagrass, bermudagrass, tall fescue, white clover, sericea lespedeza, and annual lespedeza
Management concerns:
- Surface cobbles
- Low available water capacity

Management measures:
- Proper stocking rates
- Controlled grazing
- Weed and brush control

Woodland

Woodland suitability group: 6F8
Suitability: Moderately suited
Adapted species: Loblolly pine and shortleaf pine
Management concerns:
- Cobbles in surface layer
- Moderate seedling mortality

Management measures:
- See Woodland Management and Productivity Section (Pages 68-71)

Urban Uses

Dwellings

Limitation rating: Moderate
Limitations:
- Large surface cobbles

Corrective measures:
- Raking, piling, and removing cobbles from site

Small Commercial Buildings

Limitation rating: Moderate
Limitations:
- Large surface cobbles
- Slope

Corrective measures:
- Raking, piling, and removing cobbles from site
- Special design to conform to the natural contour

Septic Tank Absorption Fields

Limitation rating: Moderate
Limitations:
- Moderate permeability
- Large cobbles

Corrective measures:
- Increase size of absorption field
- Remove cobbles from site

Local Roads and Streets

Limitation rating: Moderate
Limitations:
- Large cobbles

Corrective measures:
- Raking, piling, and removing surface cobbles

Prime Farmland

In this section, prime farmland is defined, and the soils in Scott County that are considered prime farmland are listed.

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. The acreage of high-quality farmland is limited, and the U.S. Department of Agriculture recognizes that government at local, State, and Federal levels, as well as individuals, must encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland soils, as defined by the U.S. Department of Agriculture, are soils that are best suited to food, feed, forage, fiber, and oilseed crops. Such soils have properties that favor the economic production of sustained high yields of crops. The soils need only to be treated and managed by acceptable farming methods. The moisture supply must be adequate, and the growing season must be sufficiently long. Prime farmland soils produce the highest yields with minimal expenditure of energy and economic resources. Farming these soils results in the least damage to the environment.

Prime farmland soils may presently be used as cropland, pasture, or woodland or for other purposes. They are used for food or fiber or are available for these uses. Urban or built-up land, public land, and water areas cannot be considered prime farmland. Urban or built-up land is any contiguous unit of land 10 acres or more in size that is used for such purposes as housing, industrial, and commercial sites, sites for institutions or public buildings, small parks, golf courses, cemeteries, railroad yards, airports, sanitary landfills, sewage treatment plants, and water-control structures. Public land is land not available for farming in National forests, National parks, military reservations, and State parks.

Prime farmland soils usually receive an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The acidity or alkalinity level of the soils is acceptable. The soils have few or no rocks and are permeable to water and air. They are not excessively erodible or saturated with water for long periods and are not frequently flooded during the growing season. The slope ranges mainly from 0 to 8 percent.

Areas of prime farmland are scattered throughout Scott County, but most of the prime farmland is in the central and northern parts of the county. Recently, some prime farmland soils have been converted to urban uses. The loss of prime farmland to other uses puts pressure on marginal land, which generally is wet, more erodible, droughty, or difficult to cultivate, and is less productive than prime farmland.

The following map units are considered prime farmland in Scott County. The location of each map unit is shown on the detailed soil maps at the back of this publication. The extent of each unit is given in table 4. The soil qualities that affect use and management are described in the section "Detailed Soil Map Units." This list does not constitute a recommendation for a particular land use. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name.

The soils identified as prime farmland in Scott County are:

AvB	Avilla silt loam, 1 to 3 percent slopes
Cu	Cupco silt loam, occasionally flooded (where drained)
Ka	Kenn gravelly fine sandy loam, occasionally flooded
LvB	Leadvale silt loam, 1 to 3 percent slopes
Na	Neff silt loam, occas onally flooded
NeC	Nella gravelly fine sandy loam, 3 to 8 percent slopes
SaC	Sallisaw silt loam, 0 to 3 percent slopes
Sp	Spadra fine sandy loam, occasionally flooded
Ta	Taft silt loam, 0 to 2 percent slopes
Tf	Taft silt loam, mounded

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis for predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as rangeland and woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern that is in harmony with nature.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Natural Resources Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under the heading "Detailed Soil Map Units." Specific information can be obtained from the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

Yields per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in the table are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Natural Resources Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for use as cropland. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for woodland, or for engineering purposes.

In the capability system, soils are generally grouped at three levels—capability class, subclass, and unit. Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode, but they have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e*, *w*, or *s* to the class numeral, for example, IIe. The letter *e* shows that the main hazard is the risk of erosion unless a close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); and *s* shows that the soil is limited mainly because it is shallow, droughty, or stony.

There are no subclasses in class I because the soils of this class have few limitations. The soils in class V are subject to little or no erosion, but they have other limitations that restrict their use to pasture, rangeland, woodland, wildlife habitat, or recreation. Class V contains only the subclasses indicated by *w*.

The capability classification of each map unit is given in the section "Detailed Soil Map Units."

Woodland Management and Productivity

Ken Luckow, soil scientist, Forest Service, contributed to this section.

Forest land accounts for about 479,100 acres, or about 83 percent, of Scott County (fig. 9). About 17 percent (82,600 acres) is in private nonindustrial ownership, and about 3 percent (15,000 acres) is in industrial ownership. Most of the remaining acreage is in public ownership, which is part of the Ouachita National Forest, managed by the Forest Service.

The Ouachita National Forest, first known as the Arkansas National Forest, was created by proclamation of President Theodore Roosevelt on December 18, 1907. It is the oldest national forest in the Forest Service, Southern Region (Region 8). The gross area within the proclamation boundary was then 1,073,955 acres. From the date of proclamation until 1914, the forest was administered as part of the Forest Service, District 3. The first local headquarters was at Fort Smith, Arkansas. In July 1908, the headquarters was moved to Mena, Arkansas. It was located there until June 1910 when it was moved to its present location of Hot Springs, Arkansas. As of 1997, the Ouachita National Forest covers approximately 1.6 million acres in Arkansas and Oklahoma.

As of September 30, 1996, there were 349,900 acres of national forest system land in Scott County. This land is administered by the district rangers at the Cold Springs, Fourche, Mena, Oden, and Poteau Districts.

The major forest types of the timberland in Scott County include the loblolly-shortleaf pine, which makes up about 233,100 acres; the oak-pine, which represents about 95,600 acres; and the oak-hickory, which includes about 133,800 acres. By stand-size class, this includes about 223,300 acres of sawtimber, 160,000 acres of poletimber, and about 86,800 acres of saplings and seedlings.

Forest products contribute substantially to the county's economy. According to 1997 Forest Service statistics, Scott County has 21 timber-related industries that manufacture and sell products such as pine and hardwood lumber, treated lumber, pallets, cabinets, and wood shavings. In addition, there are several privately-owned logging and sawmill operations.

Soils vary in their ability to produce trees. Available water capacity and depth of the root zone have major effects on tree growth. Fertility and texture also influence tree growth. Elevation, aspect, and climate determine the

Figure 9.—Forest land accounts for most of the land use in the survey area. Woodland management and productivity is one of the many soil interpretation categories described in this soil survey that can serve as a helpful land management tool.

kinds of trees that can grow on a site. Elevation and aspect are of particular importance in mountainous areas.

This soil survey can be used by woodland managers planning ways to increase the productivity of forest land. Some soils respond better to applications of fertilizer than others, and some are more susceptible to landslides and erosion after roads are built and timber is harvested. Some soils require special reforestation efforts. In the section "Detailed Soil Map Units," the description of each map unit in the survey area suitable for timber includes information about productivity, limitations in harvesting timber, and management concerns in producing timber. The common forest understory plants also are listed. Table 6 summarizes this forestry information and rates the soils for a number of factors to be considered in management. *Slight*, *moderate*, and *severe* are used to indicate the degree of the major soil limitations to be considered in forest management.

The table lists the *woodland suitability group symbol* for each soil. The first part of the symbol, a number, indicates

the potential productivity of a soil for the indicator species in cubic meters per hectare. The larger the number, the greater the potential productivity. Potential productivity is based on the site index and the point where mean annual increment is the greatest.

The second part of the woodland suitability group symbol, a letter, indicates the major kind of soil limitation affecting use and management. The letter *R* indicates a soil that has a significant limitation because of steepness of slope. The letter *X* indicates that a soil has restrictions because of stones or rocks on the surface. The letter *W* indicates a soil in which excessive water, either seasonal or year-round, causes a significant limitation. The letter *T* indicates a soil that has, within the root zone, excessive alkalinity or acidity, sodium salts, or other toxic substances that limit the development of desirable trees. The letter *D* indicates a soil that has a limitation because of a restricted rooting depth, such as a shallow soil that is underlain by hard bedrock, a hardpan, or other layers that restrict roots. The letter *C* indicates a soil that has a limitation because of the kind or amount of clay in the upper part of the profile. The letter *S* indicates a dry, sandy soil. The letter *F* indicates a soil that has a large amount of coarse fragments. The letter *A* indicates a soil having no significant limitations that affect forest use and management. If a soil has more than one limitation, the priority is as follows: R, X, W, T, D, C, S, and F.

The third part of the woodland suitability group symbol, a numeral, indicates the kind of trees which the soils in the group are best suited and the severity of hazards or limitations to be considered in woodland management. The hazard of erosion, equipment limitation, seedling mortality, and windthrow hazard are considered in the rating. The numerals 1, 2, and 3 indicate slight, moderate, and severe limitations, respectively, and suitability for needleleaf trees. The numerals 4, 5, and 6 indicate slight, moderate, and severe limitations, respectively, and suitability for broadleaf trees. The numerals 7, 8, and 9 indicate slight, moderate, and severe limitations, respectively, and suitability for both needleleaf and broadleaf trees.

Ratings of the *erosion hazard* indicate the probability that damage may occur if site preparation or harvesting activities expose the soil. The risk is *slight* if no particular preventive measures are needed under ordinary conditions; *moderate* if erosion-control measures are needed for particular silvicultural activities; and *severe* if special precautions are needed to control erosion for most silvicultural activities. Ratings of moderate or severe indicate the need for construction of higher standard roads, additional maintenance of roads, additional care in planning harvesting and reforestation activities, and the use of special equipment.

Ratings of *equipment limitation* indicate limits on the use of forest management equipment, year-round or seasonal, because of such soil characteristics as slope, wetness, stoniness, and susceptibility of the surface layer to compaction. As slope gradient and length increase, it becomes more difficult to use wheeled equipment. On the steeper slopes, tracked equipment is needed. On the steepest slopes, even tracked equipment cannot be operated and more sophisticated systems are needed. The rating is *slight* if equipment use is restricted by wetness for less than 2 months and if special equipment is not needed. The rating is *moderate* if slopes are so steep that wheeled equipment cannot be operated safely across the slope, if wetness restricts equipment use from 2 to 6 months per year, if stoniness restricts the use of ground-based equipment, or if special equipment is needed to prevent or minimize compaction. The rating is *severe* if slopes are so steep that tracked equipment cannot be operated safely across the slope, if wetness restricts equipment use for more than 6 months per year, if stoniness restricts the use of ground-based equipment, or if special equipment is needed to prevent or minimize compaction. Ratings of moderate or severe indicate a need to choose the best suited equipment and to carefully plan the timing of harvesting and other management activities.

Ratings of *seedling mortality* refer to the probability of the death of naturally occurring or properly planted seedlings of good stock in periods of normal rainfall, as influenced by kinds of soil or topographic features. Seedling mortality is caused primarily by too much water or too little water. The factors used in rating a soil for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the periods when the water table is high, rock fragments in the surface layer, rooting depth, and the aspect of the slope. The mortality rate generally is highest on soils that have a sandy or clayey surface layer and on soils that frequently flood. The risk is *slight* if, after site preparation, expected mortality is less than 25 percent; *moderate* if expected mortality is between 25 and 50 percent; and *severe* if expected mortality exceeds 50 percent. Ratings of moderate or severe indicate that it may be necessary to use containerized or larger than usual planting stock or to make special site preparations, such as bedding, furrowing, ripping, installing a surface drainage system, and providing artificial shade for seedlings. Reinforcement planting is often needed if the risk is moderate or severe.

Ratings of *windthrow hazard* indicate the likelihood that trees will be uprooted by the wind. A restricted rooting depth is the main reason for windthrow. The rooting depth can be restricted by a high water table, a fragipan, or bedrock or by a combination of such factors as wetness, texture, structure, and depth. The risk is *slight* if strong winds cause trees to break but do not uproot them;

moderate if strong winds cause an occasional tree to be blown over and many trees to break; and *severe* if moderate or strong winds commonly blow trees over. Ratings of moderate or severe indicate that care is needed in thinning or that the stand should not be thinned at all. Special equipment may be needed to prevent damage to shallow root systems in partial cutting operations. A plan for the periodic removal of windthrown trees and the maintenance of a road and trail systems may be needed.

The *potential productivity* of *common trees* on a soil is expressed as a *site index* and a *volume* number. Common trees are listed in the order of their observed general occurrence. Generally, only two or three tree species dominate. The first tree listed for each soil is the indicator species for that soil. An indicator species is a tree that is common in the area and that is generally the most productive on a given soil.

The *site index* is determined by taking height measurements and determining the age of selected trees within stands of a given species. This index is the average height, in feet, that trees attain in a specified number of years. This index applies to fully stocked, even-aged, unmanaged stands. The estimates of the productivity of the soils in this survey are based on published data *(3, 4, 8)*.

The *productivity class* represents an expected volume produced by the most important trees, expressed in cubic meters per hectare per year. Cubic meters per hectare per year can be converted to cubic feet per acre per year by multiplying by 14.3. Cubic feet per acre per year can then be converted to board feet by multiplying by a factor of about 5. For example, a productivity class of 7 means the soil can be expected to produce approximately 100 cubic feet per acre per year at the point where mean annual increment culminates, or about 500 board feet per acre per year.

Trees to plant are those that are used for reforestation or, under suitable conditions, natural regeneration. They are suited to the soils and can produce a commercial wood crop. The desired product, topographic position (such as a low, wet area), and personal preference are three factors among many that can influence the choice of trees for use in reforestation.

Recreation

In table 7, the soils of the survey area are rated according to the limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In the table, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or a combination of these measures.

The information in the table can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 10 and interpretations for dwellings without basements and for local roads and streets in table 9.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have gentle slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes, stones, or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the

period of use. They have moderate slopes and few or no stones or boulders on the surface.

Wildlife Habitat

Paul Brady, biologist, Natural Resources Conservation Service, contributed to this section.

Scott County includes about 479,000 acres of forest land, 122,000 acres of pastureland, and less than 500 acres of cropland.

The forests consist of hardwoods (oak-hickory climax on uplands; oak-gum climax on lowlands), shortleaf pine, loblolly pine, and eastern redcedar.

Common bermudagrass and tall fescue are the major pasture grasses. Small amounts of bahiagrass, white clover, annual lespedeza, and scattered plots of hybrid bermudagrass also exist.

Major crops grown are grain sorghum and corn. Major plant groups and species important to wildlife in the county include oaks, hickories, dogwoods, hawthorns, shortleaf pine, loblolly pine, redcedar, blackberry, elderberry, viburnums, sumacs, greenbrier, honeysuckle, wheat, bahiagrass, bluestems, fescue, clover, annual lespedeza, panicums, partridge pea, common ragweed, tickclover, and vetches.

The abundant hardwood and evergreen forests, interspersed pastures, fencerows, and numerous vegetable edges provide abundant food and cover for white-tailed deer, wild turkey, squirrels, bobwhite quail, raccoons, coyotes, opossum, foxes, rabbits, owls, numerous nongame birds, small mammals, reptiles, and other wildlife. White-tailed deer and wild turkey are especially abundant in the county and provide good hunting.

About 350,000 acres in the county is in the Ouachita National Forest. This area is managed by the Forest Service and provides habitat and public hunting for deer, squirrels, wild turkeys, and other wildlife.

Lowland habitat along streams and lakes in the county support a variety of furbearers, including beaver, muskrat, mink, raccoon, gray fox, striped skunk, and coyote.

Scott County has about 2,400 ponds, covering an estimated 800 acres. The ponds are used primarily for livestock watering and sportfishing of largemouth bass, bluegills, redear sunfish, and channel catfish.

About 1,500 surface acres of lakes are in the county, most of which are part of the Poteau River Watershed (a Natural Resources Conservation Service small watershed project). Lake Hinkle (960 acres) is one of the project lakes managed for public water supply and recreation, including sportfishing.

All of the lakes provide habitat and sportfishing for largemouth bass, bluegill, channel catfish, and other species.

About 145 miles of fishable streams are in Scott County, including the Poteau River, South Fork of Poteau, Fourche River, Upper Petit Jean River, and Dutch Creek. These streams provide habitat and sportfishing for largemouth and spotted bass, crappies, bluegills, catfish, green sunfish, and other fish.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 8, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of

the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flooding, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, lovegrass, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, wheatgrass, and grama.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are Russian-olive, autumn-olive, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, fir, cedar, and juniper.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, wildrice, saltgrass, cordgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Wildlife attracted to these areas include bobwhite quail, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, deer, and bear.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, and beaver.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kinds of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential

of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 9 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm, dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and depth to the water table.

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrinking and swelling, and organic layers can cause the movement of footings. Depth to a high water table, depth to bedrock or to a cemented pan, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, depth to a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic-supporting capacity.

Sanitary Facilities

Table 10 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

The table also shows the suitability of the soils for use as daily cover for landfill. A rating of *good* indicates that soil properties and site features are favorable for the use and that good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and

observed performance of the soils. Permeability, depth to a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

The table gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, depth to a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. Ease of excavation and revegetation should be considered.

The ratings in the table are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, depth to a water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as the final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 11 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help to determine the suitability of each

layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet and have a water table at a depth of less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In the table, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal high water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and releases a variety of plant nutrients as it decomposes.

Water Management

Table 12 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives the restrictive features that affect each soil for drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high,

constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and the potential for frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, and sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind erosion or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Waste Management

Table 16 shows the degree and kind of limitations of each soil for use in the management of manure. Manure is the excrement of livestock and poultry. The consistency of manure is labile. It changes in storage or treatment, and it depends upon the bedding used and upon whether the manure is diluted or allowed to dry. Manure will have a variable nitrogen content. The material is either solid, slurry, or liquid. A high nitrogen content limits the application rate. The ratings are for each soil in its present condition and do not consider present land use. The suitability ratings are based on the influence of existing soil properties on the use(s). For each soil rated, the degree of suitability and the most restrictive features that affect the proposed use(s) are identified. The restrictive features are identified for each moderate or severe suitability rating as it affects use and performance for the desired purpose. Thus, the user can develop alternatives for use and management. The limitations are considered *slight* if soil properties and site features are generally favorable for the application of animal waste and limitations are minor and easily overcome; *moderate* if soil properties and site features are not favorable for the application and special planning or maintenance is needed to minimize or overcome the limitations; *severe* if soil properties or site features are so unfavorable or so difficult to overcome that intense planning and management and possible increased maintenance are required.

Soil interpretations for waste management provide a means to use organic wastes and wastewater as productive resources. Using these resources will result in energy conservation, prevent waste, and minimize problems associated with their disposal. The characteristics of the soil are important in the application of organic wastes and wastewater to land for fertilization and irrigation. They are also important considerations if the soil is used as a medium for the treatment and disposal of these wastes. Favorable soil properties are required to prevent environmental damage.

The soil properties and qualities considered are those that affect soil absorption, plant growth, microbial activity, the susceptibility to wind or water erosion, and the rate and method of the application of wastes. Soil properties

that affect absorption are permeability, the depth to a seasonal high water table, sodium adsorption ratio, the depth to bedrock or a cemented pan, and the available water capacity. Soil reaction, sodium adsorption ratio, salinity, and bulk density are soil properties that affect plant growth and microbial activity. The wind erodibility group, erosion factor, slope, and susceptibility to flooding are used to measure the potential for wind and water erosion. Stones and the depth to a seasonal high water table can interfere with the application of wastes.

The table is based on utilizing the nutrients in the wastes for crop or forage production and is not directed toward reclaiming or restoring critical areas or making the most efficient use of moisture. Applications of liquid wastes can be made by tank wagon or conventional irrigation methods that are modified as necessary to function properly. Applications of solid and slurry wastes can be made at the surface or subsurface.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 13 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under the heading "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system *(2)* and the system adopted by the American Association of State Highway and Transportation Officials *(1)*.

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20, or higher, for the poorest.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of

soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 14 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate, or component, consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence the shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3-bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of movement of water through the soil when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage in each major soil layer is stated in inches of water per inch of soil. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, more than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion. Losses are expressed in tons per acre per year. These estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.02 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur over a sustained period without affecting crop

productivity. The rate is expressed in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In the table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 15 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary covering of the soil surface by flowing water, is caused by overflowing streams, by runoff from adjacent slopes, or by inflow from high tides. Shallow water standing or flowing for short periods after rainfall or snowmelt is not considered flooding. Standing water in swamps and marshes or in a closed depression is considered ponding.

The table gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency generally is expressed as *none, rare, occasional,* or *frequent. None* means that flooding is not probable. *Rare* means that flooding is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year). *Occasional* means that flooding occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year). *Frequent* means that flooding occurs often under normal weather conditions (the chance of flooding is more than a 50 percent in any year). Duration is expressed as *very brief* (less than 2 days), *brief* (2 to 7 days), *long* (7 days to 1 month), and *very long* (more than 1 month). The time of year that floods are most likely to occur is expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information on flooding is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered is local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in the table are the depth to the seasonal high water table; the kind of water table, that is, *perched, artesian,* or *apparent*; and the months of the year that the water table commonly is highest. A water table that is seasonally high for less than 1 month is not indicated in the table.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. An *artesian* water table is under hydrostatic head, generally below an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Two numbers in the column showing depth to the water table indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. A plus sign preceding the range in depth indicates that the

water table is above the surface of the soil. "More than 6.0" indicates that the water table is below a depth of 6 feet or that it is within a depth of 6 feet for less than a month.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low, moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low, moderate*, or *high*. It is based on soil texture, acidity, and the amount of sulfates in the saturation extract.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(12)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or on laboratory measurements. Table 17 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Eleven soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Entisol.

SUBORDER. Each order is divided into suborders, primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquent (*Aqu*, meaning water, plus *ent*, from Entisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Haplaquents (*Hapl*, meaning minimal horizonation, plus *aquent*, the suborder of the Entisols that has an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Haplaquents.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, mixed, nonacid, mesic Typic Haplaquents.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. There can be some variation in the texture of the surface layer or of the substratum within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" *(10)*. Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" *(12)*. Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Avilla Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Parent material: Loamy alluvium
Landform position: Stream terraces of up and drainageways
Commonly associated soils: Carnasaw, Ceda, Kenn, Leadvale, and Wilburton

Slope range: 1 to 8 percent
Taxonomic class: Fine-loamy, siliceous, thermic Typic Paleudults

Typical Pedon

Avilla silt loam, 1 to 3 percent slopes, SE¼NW¼SW¼ sec. 30, T. 1 N., R. 30 W.

Ap—0 to 6 inches; brown (10YR 4/3) silt loam; weak fine granular structure; very friable; many fine roots; few fine pores; about 10 percent, by volume, sandstone fragments less than 3 inches in diameter; strongly acid; clear smooth boundary.
BA—6 to 12 inches; strong brown (7.5YR 5/6) loam; weak fine subangular blocky structure; friable; many fine roots; few fine pores; about 10 percent, by volume, sandstone fragments less than 3 inches in diameter; strongly acid; gradual smooth boundary.
Bt1—12 to 33 inches; yellowish red (5YR 5/6) clay loam; moderate medium subangular blocky structure; friable; common distinct clay films on faces of peds; common fine roots; few fine pores; about 10 percent, by volume, sandstone fragments less than 3 inches in diameter; very strongly acid; gradual smooth boundary.
Bt2—33 to 61 inches; yellowish red (5YR 5/8) clay loam; moderate medium subangular blocky structure; friable; common distinct clay films on faces of peds; about 10 percent, by volume, sandstone fragments less than 3 inches in diameter; very strongly acid; gradual smooth boundary.
BC—61 to 72 inches; yellowish red (5YR 4/6) gravelly loam; weak fine subangular blocky structure; very friable; few fine pores; about 20 percent, by volume, sandstone fragments less than 3 inches in diameter; very strongly acid.

Range in Characteristics

Solum thickness: 60 to 85 inches
Depth to bedrock: >60 inches

A horizon:
Color—hue of 10YR, value of 4 or 5, and chroma of 3 or 4; or hue of 7.5YR, value of 4, and chroma of 4
Texture—silt loam
Content of rock fragments—0 to 15 percent by volume
Reaction—strongly acid or very strongly acid

BA horizon:
Color—hue of 7.5YR or 5YR, value of 5, and chroma of 4 or 6
Texture—loam or fine sandy loam
Content of rock fragments—0 to 15 percent by volume
Reaction—strongly acid or very strongly acid

Bt1 horizon:
Color—hue of 5YR, value of 5, and chroma of 4, 6, or 8 or value of 4 and chroma of 4 or 6
Texture—loam or clay loam
Content of rock fragments—0 to 15 percent by volume
Reaction—strongly acid or very strongly acid

Bt2 horizon:
Color—hue of 2.5YR, value of 4 or 5, and chroma of 4, 6, or 8; or hue of 5YR, value of 5, and chroma of 4, 6, or 8 or value of 4 and chroma of 4 or 6
Texture—loam, clay loam, or sandy clay loam
Content of rock fragments—0 to 15 percent by volume
Reaction—strongly acid or very strongly acid
Mottles—shades of brown or gray

BC horizon:
Color—hue of 2.5YR, value of 4 or 5, and chroma of 4, 6, or 8; or hue of 5YR, value of 5, and chroma of 4, 6, or 8 or value of 4 and chroma of 4 or 6
Texture—gravelly loam, gravelly clay loam, gravelly sandy clay loam, or their very gravelly analogs
Content of rock fragments—15 to 50 percent by volume
Reaction—strongly acid or very strongly acid
Mottles—shades of gray and brown

Cane Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Slow
Parent material: Loamy valley fill weathered from sandstone and shale
Landform position: Broad upland valleys
Commonly associated soils: Enders, Leadvale, Sallisaw, and Taft
Slope range: 3 to 8 percent
Taxonomic class: Fine-loamy, siliceous, thermic Typic Fragiudults.

Typical Pedon

Cane fine sandy loam, 3 to 8 percent slopes, in a pasture, SW¼SE¼SE¼ sec. 25, T. 5 N., R. 30 W.

Ap—0 to 5 inches; brown (7.5YR 4/4) fine sandy loam; weak fine granular structure; friable; many fine roots; strongly acid; abrupt smooth boundary.
Bt—5 to 20 inches; yellowish red (5YR 5/8) clay loam; moderate medium subangular blocky structure; friable; few faint clay films on faces of peds; few fine roots; common fine pores; strongly acid; clear wavy boundary.
Btx1—20 to 28 inches; strong brown (7.5YR 5/6) clay loam; common medium distinct pale brown (10YR 6/3)

mottles; weak coarse prismatic structure parting to moderate medium subangular blocky structure; firm; compact and brittle; few faint clay films on faces of peds; many fine pores; many medium black concretions; very strongly acid; clear smooth boundary.

Btx2—28 to 46 inches; mottled strong brown (7.5YR 5/6) and gray (10YR 6/1) clay loam; weak coarse prismatic structure parting to moderate medium subangular blocky structure; firm; compact and brittle; few faint clay films on faces of peds; many fine pores; many medium soft black concretions; very strongly acid; gradual wavy boundary.

BC—46 to 64 inches; mottled strong brown (7.5YR 5/6) and gray (10YR 6/1) silty clay loam; moderate medium subangular blocky structure; firm; common fine pores; many medium soft black concretions; about 5 percent, by volume, shale fragments; very strongly acid; abrupt smooth boundary.

Cr—64 to 72 inches; partially weathered, soft, acid, shale bedrock.

Range in Characteristics

Solum thickness: 60 to 80 inches or more
Depth to bedrock: >60 inches
Depth to fragipan: 20 to 35 inches

A horizon:
Color—hue of 7.5YR, value of 4 or 5, and chroma of 4; or hue of 10YR, value of 4 or 5, and chroma of 3 or 4
Texture—fine sandy loam
Content of rock fragments—0 to 15 percent by volume
Reaction—moderately acid or strongly acid

Bt horizon:
Color—hue of 2.5YR, value of 4 or 5, and chroma of 4, 6, or 8; or hue of 5YR, value of 4, and chroma of 4 or 6 or value of 5 and chroma of 4, 6, or 8
Texture—loam, clay loam, or silty clay loam
Content of rock fragments—0 to 15 percent by volume
Reaction—strongly acid or very strongly acid

Btx horizon:
Color—hue of 10YR or 7.5YR, value of 5, and chroma of 6 or 8; or hue of 5YR, value of 5, and chroma of 6 or 8 or value of 4 and chroma of 6; or hue of 2.5YR, value of 4 or 5, and chroma of 6 or 8; or lack a dominant color and are in shades of brown, red, or gray
Texture—clay loam or loam
Content of rock fragments—0 to 15 percent by volume
Reaction—strongly acid or very strongly acid
Mottles—shades of gray or brown

Bc horizon:
Color—hue of 10YR or 7.5YR, value of 5, and chroma of 6 or 8; or hue of 5YR, value of 5, and chroma of 6 or 8 or value of 4 and chroma of 6; or hue of 2.5YR, value of 4 or 5, and chroma of 6 or 8; or lack a dominant color and are in shades of brown, red, or gray
Texture—silty clay loam or clay loam
Content of rock fragments—0 to 15 percent by volume
Reaction—strongly acid or very strongly acid
Mottles—shades of gray or brown

Cr layer:
Type of bedrock—partially weathered, soft shale with lenses of sandstone in places

Carnasaw Series

Depth class: Deep
Drainage class: Well drained
Permeability: Slow
Parent material: Clayey residuum from shale with lenses of sandstone
Landform position: Tops and sides of ridges and mountains
Commonly associated soils: Avilla, Caston, Ceda, Clebit, Kenn, Octavia and Sherless
Slope range: 3 to 60 percent
Taxonomic class: Clayey, mixed, thermic Typic Hapludults

Typical Pedon

Carnasaw cobbly silt loam, in an area of Carnasaw-Sherless complex, 8 to 20 percent slopes, on wooded sideslope, SE¼SE¼SE¼ sec. 5, T. 1 N., R. 32 W.

A—0 to 4 inches; very dark grayish brown (10YR 3/2) cobbly silt loam; weak fine granular structure; friable; many fine and medium roots; common fine pores; about 25 percent, by volume, angular sandstone fragments less than 10 inches in diameter; strongly acid; clear smooth boundary.

E—4 to 11 inches; yellowish brown (10YR 5/4) cobbly silt loam; weak fine subangular blocky structure; friable; many fine and medium roots; common fine pores; about 20 percent, by volume, angular sandstone fragments less than 5 inches in diameter; strongly acid; clear smooth boundary.

Bt1—11 to 27 inches; yellowish red (5YR 4/6) clay; moderate fine and medium subangular blocky structure; firm; few faint clay films on faces of peds; common fine and medium roots; common fine pores; about 5 percent, by volume, shale and sandstone fragments ¼ inch to 3 inches in diameter, very strongly acid; clear smooth boundary.

Bt2—27 to 34 inches; red (2.5YR 4/6) clay; few fine

prominent strong brown mottles; moderate fine and medium subangular blocky structure; firm; many distinct clay films on faces of peds; common fine roots; common fine pores; about 5 percent, by volume, shale and sandstone fragments 1/4 inch to 3 inches in diameter; very strongly acid; gradual smooth boundary.

Bt3—34 to 40 inches; red (2.5YR 4/8) clay; common medium prominent yellowish brown (10YR 5/8) mottles; moderate fine and medium subangular blocky structure; firm; many distinct clay films on faces of peds; few fine roots; few fine pores; about 5 percent, by volume, shale and sandstone fragments 1/4 inch to 3 inches in diameter; very strongly acid; clear smooth boundary.

Bt4—40 to 50 inches; mottled, red (2.5YR 4/6) and gray (10YR 6/1) channery clay; moderate medium subangular structure; firm; many distinct clay films on faces of peds; few fine roots; few fine pores; about 25 percent, by volume, shale fragments less than 3 inches in diameter; very strongly acid; clear wavy boundary.

BC—50 to 58 inches; mottled, strong brown (7.5YR 5/6) and gray (10YR 6/1) channery silty clay; weak medium subangular blocky structure; about 30 percent, by volume, partially weathered shale fragments less than 3 inches in diameter; very strongly acid; clear irregular boundary.

Cr—58 to 65 inches; highly fractured, soft, acid, shale bedrock tilted more than 20 degrees from horizontal with lenses of sandstone.

Range in Characteristics

Solum thickness: 40 to 60 inches
Depth to bedrock: 40 to 60 inches

A horizon:
- Color—hue of 10YR, value of 3 or 4, and chroma of 2 or 3
- Texture—gravelly silt loam, cobbly silt loam, stony silt loam, or very stony silt loam
- Content of rock fragments—15 to 60 percent by volume
- Reaction—moderately acid or strongly acid

E horizon:
- Color—hue of 10YR, value of 5 or 6, and chroma of 3 or 4; or hue of 7.5YR, value of 5, and chroma of 4
- Texture—loam, silt loam, or their gravelly or cobbly analogs
- Content of rock fragments—5 to 25 percent by volume
- Reaction—moderately acid or strongly acid

Bt1 horizon:
- Color—hue of 2.5YR or 5YR, value of 4, and chroma of 6 or value of 5 and chroma of 6 or 8; or hue of 7.5YR, value of 5, and chroma of 6 or 8
- Texture—silty clay loam, clay loam, silty clay, or clay
- Content of rock fragments—2 to 10 percent by volume
- Reaction—strongly acid or very strongly acid

Bt2 horizon:
- Color—hue of 2.5YR or 5YR, value of 4, and chroma of 6 or value of 5 and chroma of 6 or 8
- Texture—silty clay or clay
- Content of rock fragments—2 to 10 percent by volume
- Reaction—strongly acid or very strongly acid
- Mottles—shades of brown

Bt3 horizon:
- Color—hue of 2.5YR, value of 4 or 5, and chroma of 6 or 8; or hue of 5YR, value of 4, and chroma of 6 or value of 5 and chroma of 6 or 8
- Texture—silty clay, clay, or their channery or gravelly analogs
- Content of rock fragments—5 to 35 percent by volume
- Reaction—strongly acid or very strongly acid
- Mottles—shades of red, brown, or gray

Bt4 horizon:
- Color—hue of 2.5YR, value of 4 or 5, and chroma of 6 or 8; or hue of 5YR, value of 4, and chroma of 6 or value of 5 and chroma of 6 or 8; or lack a dominant color and are in shades of brown, red, or gray
- Texture—silty clay, clay, or their channery or gravelly analogs
- Content of rock fragments—5 to 35 percent by volume
- Reaction—strongly acid or very strongly acid
- Mottles—shades of red, brown, or gray

BC horizon:
- Color—hue of 5YR or 7.5YR, value of 5, and chroma of 6 or 8; or hue of 2.5YR, value of 4 or 5, and chroma of 6 or 8; or lack a dominant color and are in shades of brown, red, or gray
- Texture—silty clay, clay, or their gravelly or channery analogs
- Content of rock fragments—5 to 35 percent by volume
- Reaction—strongly acid or very strongly acid
- Mottles—shades of red, brown, and gray

Cr layer:
- Type of bedrock—Partially weathered, soft, acid, shale with lenses of sandstone tilted 20 to 40 degrees from horizontal

Caston Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate

Parent material: Loamy colluvium
Landform position: Colluvial benches and footslopes
Commonly associated soils: Carnasaw and Octavia
Slope range: 35 to 60 percent
Taxonomic class: Loamy-skeletal, siliceous, thermic Typic Paleudults

Typical Pedon

Caston very stony fine sandy loam, in a wooded area of Octavia-Carnasaw-Caston complex, 35 to 60 percent slopes, SE¼NW¼SW¼ sec. 36, T. 1 N., R. 30 W.

A—0 to 4 inches; brown (10YR 4/3) very stony fine sandy loam; weak fine granular structure; very friable; many fine and medium roots; common fine pores; about 50 percent, by volume, sandstone stones up to 30 inches in diameter; strongly acid; clear smooth boundary.
E—4 to 9 inches; brown (10YR 5/3) very cobbly fine sandy loam; weak fine subangular blocky structure; friable; many fine and medium roots; common fine pores; about 40 percent, by volume, sandstone cobbles up to 10 inches in diameter; strongly acid; clear smooth boundary.
BE—9 to 21 inches; strong brown (7.5YR 5/6) very gravelly loam; weak medium subangular blocky structure; friable; common fine and medium roots; common fine pores; about 40 percent, by volume, sandstone gravel less than 3 inches in diameter; strongly acid; gradual smooth boundary.
Bt1—21 to 43 inches; yellowish red (5YR 5/6) very gravelly sandy clay loam; weak fine and medium subangular blocky structure; friable; common fine and medium roots; common fine pores; few faint clay films on faces of peds; about 50 percent, by volume, sandstone gravel less than 3 inches in diameter; very strongly acid; gradual smooth boundary.
Bt2—43 to 72 inches; yellowish red (5YR 5/8) extremely gravelly clay loam; weak medium subangular blocky structure; friable; common fine roots; common fine pores; few faint clay films on faces of peds; about 60 percent, by volume, sandstone gravel less than 3 inches in diameter; very strongly acid.

Range in Characteristics

Solum thickness: >60 inches
Depth to bedrock: >60 inches

A horizon:
Color—hue of 10YR, value of 3 or 4, and chroma of 2 to 4
Texture—very stony fine sandy loam
Content of rock fragments—35 to 60 percent by volume
Reaction—moderately acid or strongly acid

E horizon:
Color—hue of 10YR, value of 5 or 6, and chroma of 3 or 4
Texture—very gravelly fine sandy loam, very gravelly loam, or their very cobbly analogs
Content of rock fragments—35 to 60 percent by volume
Reaction—moderately acid or strongly acid

BE horizon:
Color—hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 4 or 6
Texture—very gravelly loam, very gravelly fine sandy loam, very cobbly loam, very cobbly fine sandy loam, or their extremely gravelly or cobbly analogs
Content of rock fragments—40 to 70 percent
Reaction— strongly acid or very strongly acid

Bt horizon:
Color—hue of 5YR, value of 4, and chroma of 6 or value of 5 and chroma of 6 or 8; or hue of 7.5YR, value of 5, and chroma of 6 or 8
Texture—very gravelly clay loam; very gravelly sandy clay loam; or their very cobbly, extremely gravelly, or extremely cobbly analogs
Content of rock fragments—40 to 70 percent
Reaction—very strongly acid

Ceda Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Rapid
Parent material: Loamy alluvium with high content of gravels and cobbles
Landform position: Flood plains
Commonly associated soils: Avilla, Carnasaw, Enders, Kenn, Nella, Sherless, Spadra, and Wilburton
Slope range: 0 to 3 percent
Taxonomic class: Loamy-skeletal, siliceous, nonacid, thermic Typic Udifluvents

Typical Pedon

Ceda very cobbly loam (fig. 10), frequently flooded, in a field of Kenn-Ceda complex, frequently flooded, NE¼SW¼NE¼ sec. 23, T. 1 N., R. 32 W.

A—0 to 7 inches; dark grayish brown (10YR 4/2) very cobbly loam; weak fine granular structure; very friable; about 50 percent, by volume, rounded sandstone fragments up to 8 inches in diameter; moderately acid; clear wavy boundary.
C1—7 to 13 inches; dark yellowish brown (10YR 4/4) very gravelly loam; massive; very friable; about 40 percent, by volume, rounded sandstone fragments less than 3

Figure 10.—Typical pedon of Ceda very cobbly loam. This soil formed in loamy and very gravelly alluvium. Depth is marked in feet.

inches in diameter; common thin bedding planes of yellowish brown (10YR 5/4) silt loam; moderately acid; clear wavy boundary.
C2—13 to 33 inches; strong brown (7.5YR 5/6) very gravelly loam; massive; very friable; about 50 percent, by volume, rounded sandstone fragments less than 3 inches in diameter; common thin bedding planes of yellowish brown (10YR 5/4) silt loam; moderately acid; clear wavy boundary.
C3—33 to 72 inches; strong brown (7.5YR 5/6) very gravelly loam; massive; very friable; about 60 percent, by volume, rounded sandstone fragments less than 5 inches in diameter; moderately acid.

Range in Characteristics

Depth to bedrock: >60 inches

A horizon:
Color—hue of 10YR, value of 3 to 5, and chroma of 2 or 3
Texture—very cobbly loam
Content of rock fragments—35 to 60 percent by volume
Reaction— Slightly acid or moderately acid

C horizon:
Color—hue of 10YR or 7.5YR, value of 4, and chroma of 4; or hue of 7.5YR or 10YR, value of 5, and chroma of 4 or 6
Texture—very gravelly loam, very gravelly fine sandy loam, very gravelly clay loam, or their extremely gravelly analogs
Content of rock fragments—35 to 85 percent by volume
Reaction—slightly acid or moderately acid

Clebit Series (fig. 11)

Depth class: Shallow
Drainage class: Well drained
Permeability: Moderately rapid
Parent material: Loamy residuum from sandstone
Landform position: Tops and sideslopes of ridges and mountains
Commonly associated soils: Carnasaw, Octavia, and Sherless
Slope range: 3 to 60 percent
Taxonomic class: Loamy-skeletal, siliceous, thermic Lithic Dystrochrepts

Typical Pedon

Clebit very stony fine sandy loam, in an area of Clebit-Carnasaw-Sherless complex, 35 to 60 percent slopes, NW¼SW¼NW¼ sec. 35, T. 1 N., R. 30 W.

A—0 to 4 inches; brown (10YR 4/3) very stony fine sandy loam; weak fine granular structure; friable; few fine roots; few fine pores; about 50 percent, by volume, sandstone fragments up to 16 inches in diameter; strongly acid; abrupt smooth boundary.
Bw—4 to 16 inches; yellowish brown (10YR 5/6) very cobbly fine sandy loam; weak fine subangular blocky structure; friable; few fine roots; about 45 percent, by volume, sandstone fragments up to 10 inches in diameter; very strongly acid; clear wavy boundary.
R—16 to 18 inches; hard, gray, yellow, and brown sandstone; fractured and tilted about 35 degrees from horizontal.

Range in Characteristics

Solum thickness: 10 to 20 inches
Depth to bedrock: <20 inches

A horizon:
Color—hue of 10YR, value of 3 or 4, and chroma of 2 or 3
Texture—very stony fine sandy loam
Content of rock fragments—35 to 60 percent by volume
Reaction—moderately ac d or strongly acid

Bw horizon:
Color—hue of 10YR, value of 4 or 5, and chroma of 4 or 6; or hue of 7.5YR, value of 5, and chroma of 4 or 6
Texture—very cobbly fine sandy loam, very cobbly loam, or their very gravelly analogs
Content of rock fragments—35 to 60 percent by volume
Reaction—strongly acid or very strongly acid

R layer:
Type of bedrock—unweathered, hard, yellow, gray, and brown sandstone with lenses of shale fractured and tilted more than 20 degrees from horizontal

Cupco Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderately slow
Parent material: Loamy alluvium
Landform position: Flood plains
Commonly associated soils: Neff, Rexor, and Spadra
Slope range: 0 to 2 percent
Taxonomic class: Fine-silty, siliceous, thermic Typic Epiaqualfs

Typical Pedon

Cupco silt loam, occasionally flooded, in a wooded area, SW¼SE¼SW¼ sec. 2, T. 2 N., R. 26 W.

Figure 11.—Clebit soils are shallow, the underlying bedrock is tilted and fractured, and they have limited land use potential.

A—0 to 8 inches, dark grayish brown (10YR 4/2) silt loam; few fine faint light brownish gray (10YR 6/2) mottles; fine granular structure; friable; many fine roots; few fine pores; strongly acid; clear smooth boundary.

BA—8 to 15 inches, grayish brown (10YR 5/2) silt loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; friable; common fine roots; strongly acid; clear smooth boundary.

Bt1—15 to 30 inches, dark grayish brown (10YR 4/2) silty clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; firm; few faint clay films on faces of peds; common fine roots; few fine pores; strongly acid; gradual smooth boundary.

Bt2—30 to 61 inches, brown (10YR 4/3) silty clay loam; common medium distinct light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; friable; few faint clay films on faces of peds; few fine pores; strongly acid; clear wavy boundary.

BC—61 to 72 inches, brown (10YR 4/3) silty clay loam; common medium distinct gray (10YR 6/1) mottles; weak medium subangular blocky structure; friable; few fine pores; strongly acid.

Range in Characteristics

Solum thickness: >60 inches
Depth to bedrock: >60 inches

A horizon:

Color—hue of 10YR, value of 4 or 5, and chroma of 2 or 3

Texture—silt loam
Reaction—slightly acid to strongly acid
Mottles—shades of brown or gray

BA horizon:
Color—hue of 10YR, value of 5 or 6, and chroma of 2 or 3
Texture—silt loam or silty clay loam
Reaction—slightly acid to strongly acid
Mottles—shades of brown or gray

Bt horizon:
Color—hue of 10YR, value of 4 or 5, and chroma of 2 or 3
Texture—silty clay loam or silt loam
Reaction— moderately acid to very strongly acid
Mottles—shades of brown or gray

BC horizon:
Color—hue of 10YR, value of 4 or 5, and chroma of 2 or 3
Texture—silty clay loam or clay loam
Reaction—moderately acid to strongly acid
Mottles—shades of brown or gray

Enders Series

Depth class: Deep
Drainage class: Well drained
Permeability: Very slow
Parent material: Thin layer of loamy colluvium over clayey residuum from acid, shale bedrock
Landform position: Sideslopes and footslopes of ridges and mountains
Commonly associated soils: Cane, Ceda, Endsaw, Kenn, Leadvale, Linker, Mountainburg, Nella, and Sallisaw
Slope range: 3 to 65 percent
Taxonomic class: Clayey, mixed, thermic Typic Hapludults

Typical Pedon

Enders gravelly silt loam, 8 to 20 percent slopes, SE¼SE¼SE¼ sec. 20, T. 4 N., R. 29 W.

A—0 to 4 inches; dark brown (10YR 4/3) gravelly silt loam; weak fine granular structure; friable; about 15 percent, by volume, sandstone gravel less than 3 inches in diameter; strongly acid; clear smooth boundary.
BA—4 to 9 inches; strong brown (7.5YR 5/6) loam; weak fine subangular blocky structure; friable; about 10 percent, by volume, sandstone gravel less than 3 inches in diameter; strongly acid; gradual smooth boundary.
Bt1—9 to 30 inches; yellowish red (5YR 5/6) silty clay; common medium distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; firm; few faint clay films on faces of peds; very strongly acid; gradual smooth boundary.
Bt2—30 to 45 inches; yellowish red (5YR 5/6) silty clay; common medium distinct strong brown (7.5YR 5/6) and few medium prominent light brownish gray (10YR 5/2) mottles; moderate medium subangular blocky structure; firm; many prominent clay films on faces of peds; about 10 percent, by volume, shale fragments less than 3 inches in diameter; very strongly acid; gradual smooth boundary.
BC—45 to 57 inches; mottled yellowish brown (10YR 5/6), yellowish red (5YR 5/6), and light gray (10YR 7/1) channery silty clay; moderate fine subangular blocky structure; firm; about 20 percent, by volume, shale fragments less than 3 inches in diameter; extremely acid; abrupt wavy boundary.
Cr—57 to 65 inches; weathered, soft, level-bedded shale bedrock.

Range in Characteristics

Solum thickness: 40 to 60 inches
Depth to bedrock: 40 to 60 inches

A horizon:
Color—hue of 10YR, value of 3 or 4, and chroma of 2 or 3; in cultivated areas, hue of 10YR, value of 4 or 5, and chroma of 3 or 4
Texture—gravelly silt loam, cobbly silt loam, or stony silt loam
Content of rock fragments—15 to 35 percent
Reaction—strongly acid to extremely acid

BA horizon:
Color—hue of 7.5YR, value of 5, and chroma of 6 or 8
Texture—loam or silt loam or their gravelly, cobbly, or stony analogs
Content of rock fragments—0 to 35 percent by volume
Reaction—strongly acid to extremely acid

Bt horizon:
Color—hue of 5YR, value of 4, and chroma of 6 or value of 5 and chroma of 6 or 8; or hue of 2.5YR, value of 4 or 5, and chroma of 6 or 8
Texture—silty clay or clay
Content of rock fragments—0 to 15 percent by volume
Reaction—strongly acid to extremely acid
Mottles—shades of red, brown, and gray

BC horizon:
Color—mottled in shades of red, brown, and gray
Texture—silty clay, clay, or their channery analogs
Content of rock fragments—5 to 25 percent by volume
Reaction—strongly acid to extremely acid

Cr layer:
Type of bedrock—weathered, soft, level-bedded shale

Endsaw Series

Depth class: Deep
Drainage class: Well drained
Permeability: Slow
Parent material: Thin layer of loamy colluvium over clayey residuum from acid shale that is tilted 0 to 20 degrees from horizontal
Landform position: Sideslopes and footslopes of ridges and mountains
Commonly associated soils: Carnasaw, Enders, Leadvale, and Sallisaw
Slope range: 3 to 35 percent
Taxonomic class: Clayey, mixed, thermic Typic Hapludults

Typical Pedon

Endsaw gravelly loam, 3 to 8 percent slopes, NW¼NW¼SE¼ sec. 5, T. 3 N., R. 29 W.

A—0 to 4 inches; brown (10YR 4/3) gravelly loam; weak fine granular structure; friable; about 25 percent, by volume, sandstone gravel less than 3 inches in diameter; strongly acid; clear smooth boundary.

Bt1—4 to 9 inches; yellowish red (5YR 5/6) silty clay; weak medium subangular blocky structure; friable; few faint clay films on faces of peds; about 10 percent, by volume, sandstone gravel less than 3 inches in diameter; very strongly acid; clear smooth boundary.

Bt2—9 to 24 inches; yellowish red (5YR 5/6) silty clay; moderate medium subangular blocky structure; firm; many prominent clay films of faces of peds; about 10 percent, by volume, sandstone and shale fragments less than 3 inches in diameter; very strongly acid; gradual smooth boundary.

Bt3—24 to 36 inches; yellowish red (5YR 4/6) silty clay; moderate medium subangular blocky structure; firm; many prominent clay films on faces of peds; about 10 percent, by volume, shale fragments less than 3 inches in diameter; very strongly acid; gradual wavy boundary.

BC—36 to 51 inches; yellowish red (5YR 4/6) channery silty clay; common medium distinct gray (10YR 6/1) mottles; moderate medium platy structure; friable; about 30 percent, by volume, shale fragments less than 5 inches in diameter; very strongly acid; diffuse irregular boundary.

Cr—51 to 72 inches; partially weathered, soft, fractured, acid, shale bedrock that is tilted about 15 degrees from horizontal.

Range in Characteristics

Solum thickness: 40 to 60 inches
Depth to bedrock: 40 to 60 inches

A horizon:
Color—hue of 10YR, value of 3 or 4, and chroma of 2 or 3
Texture—gravelly loam, cobbly loam, or stony loam
Content of rock fragments—15 to 35 percent by volume
Reaction—moderately acid or strongly acid

E horizon (where present):
Color—hue of 10YR, value of 5, and chroma of 3 or 4
Texture—gravelly loam or cobbly loam
Content of rock fragments—15 to 35 percent by volume
Reaction—moderately acid or strongly acid

Bt horizon:
Color—hue of 5YR, value of 4, and chroma of 6 or value of 5 and chroma of 6 or 8; or hue of 2.5YR, value of 5, and chroma of 6 or 8
Texture—silty clay or clay
Content of rock fragments—0 to 15 percent by volume
Reaction—strongly acid or very strongly acid
Mottles—shades of gray, brown, or red

BC horizon:
Color—hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6 or 8
Texture—silty clay, clay, or their channery analogs
Content of rock fragments—5 to 30 percent by volume
Reaction—strongly acid or very strongly acid
Mottles—shades of red, brown, and gray

Cr layer:
Type of bedrock—soft, weathered, shale that is tilted 0 to 20 degrees from horizontal

Kenn Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Parent material: Loamy alluvium
Landform position: Flood plains
Commonly associated soils: Avilla, Carnasaw, Ceda, Enders, Nella, Sherless, Spadra, and Wilburton
Slope range: 0 to 3 percent
Taxonomic class: Fine-loamy, siliceous, thermic Ultic Hapludalfs

Typical Pedon

Kenn gravelly fine sandy loam (fig. 12), occasionally flooded, in a pasture, NW¼SE¼NE¼ sec. 24, T. 1 N., R. 29 W.

Ap—0 to 9 inches; brown (7.5YR 4/4) gravelly fine sandy loam; weak fine granular structure; very friable; about

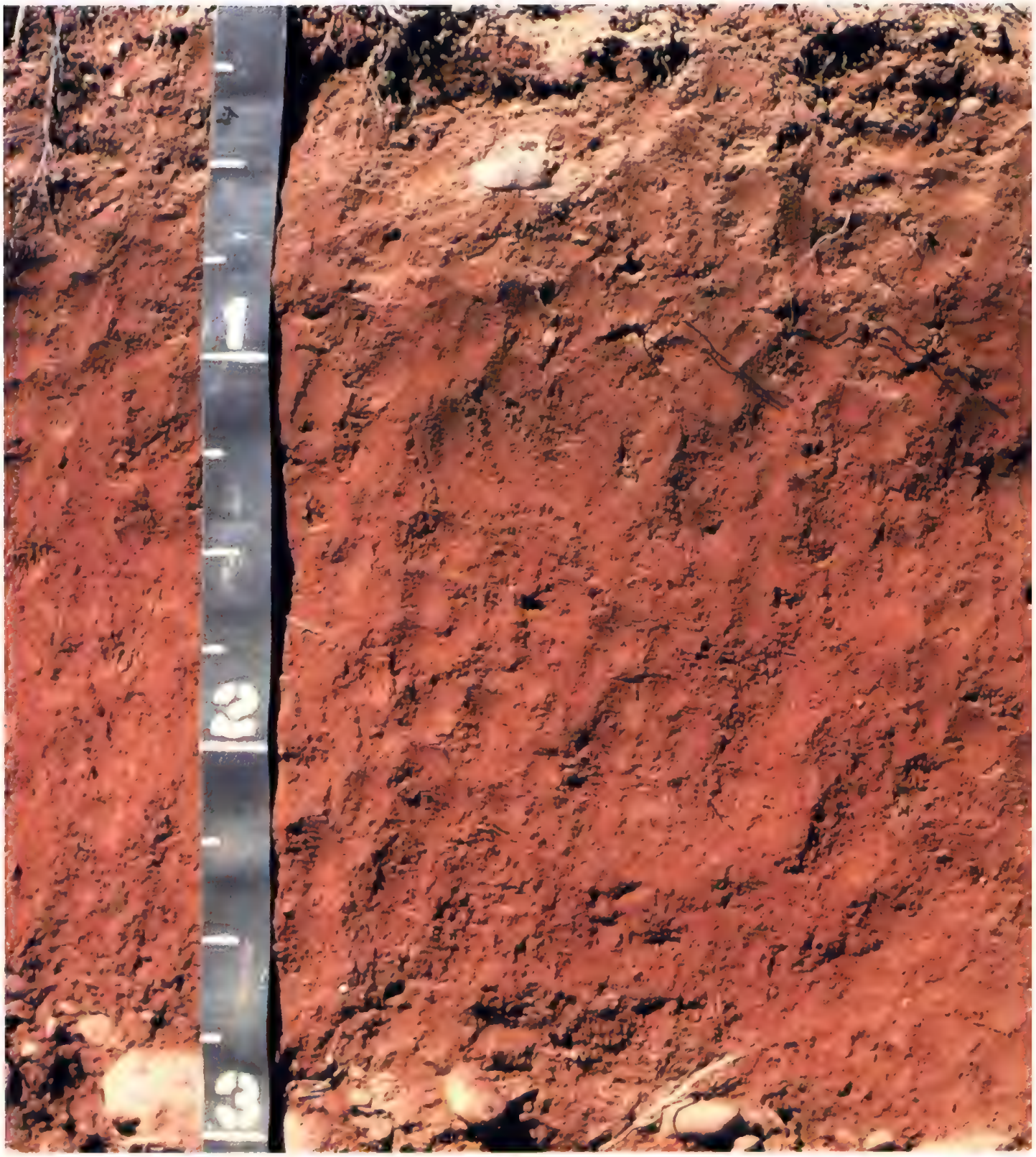

Figure 12.—Typical pedon of Kenn gravelly fine sandy loam. This soil formed in loamy and gravelly alluvium. Depth is marked in feet.

15 percent, by volume, rounded sandstone fragments less than 3 inches in diameter; moderately acid; abrupt smooth boundary.

Bt1—9 to 17 inches; strong brown (7.5YR 5/6) clay loam; weak fine subangular blocky structure; friable; few faint clay film on faces of peds; about 5 percent, by volume, rounded sandstone fragments less than 3 inches in diameter; strongly acid; clear smooth boundary.

Bt2—17 to 27 inches; strong brown (7.5YR 5/6) sandy clay loam; weak fine subangular blocky structure; friable; few faint clay films on faces of peds; about 5 percent, by volume, rounded sandstone fragment less than 3 inches in diameter; very strongly acid; clear irregular boundary.

2Bt3—27 to 42 inches; brown (7.5YR 4/4) very gravelly sandy clay loam; weak fine subangular blocky structure; friable; few faint clay films on faces of peds; about 40 percent, by volume, rounded sandstone fragments less than 3 inches in diameter; very strongly acid; gradual wavy boundary.

2C—42 to 72 inches; brown (7.5YR 4/4) extremely gravelly loam; massive; friable; about 65 percent, by volume, rounded sandstone fragments less than 3 inches in diameter; very strongly acid.

Range in Characteristics

Solum thickness: 40 to 60 inches
Depth to bedrock: >60 inches

A horizon:
- Color—hue of 10YR, value of 3 or 4, and chroma of 2, 3, or 4; or has hue of 7.5YR, value of 4, and chroma of 2 or 4
- Texture—gravelly fine sandy loam
- Content of rock fragments—15 to 35 percent by volume
- Reaction—slightly acid to strongly acid

BA horizon (where present):
- Color—hue of 5YR, value of 4 or 5, and chroma of 4 or 6; or hue of 7.5YR, value of 4, and chroma of 4 or value of 5 and chroma of 4 or 6
- Texture—loam, fine sandy loam, or their gravelly analogs
- Content of rock fragments—5 to 35 percent by volume
- Reaction—strongly acid or very strongly acid

Bt horizon:
- Color—hue of 5YR, value of 4 or 5, and chroma of 4 or 6; or hue of 7.5YR, value of 4, chroma of 4 or value of 5 and chroma of 4 or 6
- Texture—clay loam, sandy clay loam, or their gravelly analogs
- Content of rock fragments—Content ranges from about 5 to 30 percent by volume
- Reaction—strongly acid or very strongly acid

2Bt horizon:
- Color—hue of 5YR, value of 4 or 5, and chroma of 4 or 6; or hue of 7.5YR, value of 4, and chroma of 4 or value of 5 and chroma of 4 or 6
- Texture—very gravelly sandy clay loam or very gravelly clay loam
- Content of rock fragments—35 to 60 percent by volume
- Reaction—strongly acid or very strongly acid

2C horizon:
- Color—hue of 10YR, value of 4, and chroma of 4 or value of 5 and chroma of 4 or 6; or hue of 7.5YR, value of 4, and chroma of 4 or value of 5 and chroma of 4 or 6
- Texture—extremely gravelly sandy clay loam, extremely gravelly loam, or extremely gravelly fine sandy loam
- Content of rock fragments—60 to 90 percent by volume
- Reaction—strongly acid or very strongly acid

Leadvale Series

Depth class: Deep to very deep
Drainage class: Moderately well drained
Permeability: Moderate above the fragipan and slow in the fragipan
Parent material: Loamy material from local uplands
Landform position: Broad upland valley floors
Commonly associated soils: Avilla, Cane, Enders, Endsaw, Sallisaw, and Taft
Slope range: 1 to 8 percent
Taxonomic class: Fine-silty, siliceous, thermic Typic Fragiudults

Typical Pedon

Leadvale silt loam, 1 to 3 percent slopes, in a pasture, NW¼NW¼SW¼ sec. 22, T. 3 N., R. 29 W.

Ap—0 to 8 inches; brown (10YR 5/3) silt loam; weak fine granular structure; friable; many fine roots; common fine pores; strongly acid; abrupt smooth boundary.

Bt1—8 to 20 inches; yellowish brown (10YR 5/6) silt loam; weak fine and medium subangular blocky structure; friable; few faint clay films on faces of peds; many fine roots; common fine pores; strongly acid; clear smooth boundary.

Bt2—20 to 25 inches; yellowish brown (10YR 5/6) silt loam; common medium distinct pale brown (10YR 6/3) mottles; weak fine and medium subangular blocky structure; friable; common faint clay films on faces of

peds; few fine roots; common fine pores; strongly acid; abrupt irregular boundary.
Btx—25 to 65 inches; mottled gray (10YR 6/1), light brownish gray (10YR 6/2), and strong brown (7.5YR 5/6) silty clay loam; weak coarse prismatic structure parting to moderate medium subangular blocky structure; firm; compact and brittle; common faint clay films on faces of peds; common fine pores; very strongly acid; gradual wavy boundary.
BC—65 to 72 inches; mottled yellowish brown (10YR 5/6), strong brown (7.5YR 5/6), and light gray (10YR 7/1) silty clay loam; moderate medium subangular blocky structure; friable; common fine pores; very strongly acid.

Range in Characteristics

Solum thickness: 48 to 80 inches or more
Depth to bedrock: >48 inches
Depth to fragipan: 20 to 30 inches

Ap horizon:
Color—hue of 10YR, value of 4, and chroma of 2 or 3 or value of 5 and chroma of 3
Texture—silt loam
Content of rock fragments—0 to 5 percent
Reaction—strongly acid or very strongly acid

BA horizon (where present):
Color—hue of 7.5YR or 10YR, value of 5, and chroma of 6 or 8
Texture—silt loam or silty clay loam
Content of rock fragments—0 to 5 percent
Reaction—strongly acid or very strongly acid

Bt horizon:
Color—hue of 10YR, value of 5, and chroma of 6 or 8; or hue of 7.5YR, value of 5, and chroma of 6 or 8
Texture—silt loam or silty clay loam
Content of rock fragments—0 to 5 percent
Reaction—strongly acid or very strongly acid
Mottles—shades of brown in lower part of horizon in some pedons

Btx horizon:
Color—hue of 10YR or 7.5YR, value of 5, and chroma of 6 or 8; or lack a dominant color and are in shades of brown and gray
Texture—silt loam or silty clay loam
Content of rock fragments—0 to 5 percent
Reaction—strongly acid or very strongly acid
Mottles—shades of gray and brown

BC horizon:
Color—hue of 10YR or 7.5YR, value of 5, and chroma of 6 or 8; or lack a dominant color and are in shades of brown and gray
Texture—silty clay loam or silty clay
Content of rock fragments—0 to 5 percent
Reaction—strongly acid or very strongly acid
Mottles—shades of gray and brown

Linker Series

Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderate
Parent material: Loamy residuum from acid sandstone
Landform position: Tops of ridges and mountains
Commonly associated soils: Enders, Mountainburg, and Nella
Slope range: 3 to 8 percent
Taxonomic class: Fine-loamy, siliceous, thermic Typic Hapludults

Typical Pedon

Linker gravelly fine sandy loam, in an area of Linker-Mountainburg complex, 3 to 8 percent slopes, SE¼SW¼SW¼ sec. 14, T. 4 N., R. 26 W.

Ap—0 to 6 inches; brown (7.5YR 4/4) gravelly fine sandy loam; weak fine granular structure; friable; about 15 percent, by volume, sandstone gravel less than 3 inches in diameter; many fine roots; strongly acid; abrupt smooth boundary.
BA—6 to 13 inches; yellowish red (5YR 5/6) fine sandy loam; weak fine subangular blocky structure; friable; very strongly acid; gradual smooth boundary.
Bt—13 to 28 inches; yellowish red (5YR 5/8) sandy clay loam; moderate medium subangular blocky structure; friable; few faint clay films on faces of peds; very strongly acid; abrupt wavy boundary.
R—28 to 36 inches; level-bedded, hard, sandstone bedrock.

Range in Characteristics

Solum thickness: 20 to 40 inches
Depth to bedrock: 20 to 40 inches

A or Ap horizon:
Color—hue of 10YR, value of 4, and chroma of 2 or 4 or value of 4 or 5 and chroma of 3; or hue of 7.5YR, value of 4, and chroma of 4
Texture—gravelly fine sandy loam
Content of rock fragments—15 to 35 percent by volume
Reaction—strongly acid or very strongly acid

E horizon (where present):
Color—hue of 10YR, value of 5, and chroma of 3 or 4
Texture—fine sandy loam, loam, or their gravelly analogs
Content of rock fragments—0 to 25 percent by volume
Reaction—strongly acid or very strongly acid

BA horizon:
Color—hue of 7.5YR, value of 5, and chroma of 6; or hue of 5YR, value of 4, and chroma of 6 or value of 5 and chroma of 6 or 8
Texture—fine sandy loam, sandy clay loam, or loam
Content of rock fragments—0 to 10 percent by volume
Reaction—strongly acid or very strongly acid

Bt horizon:
Color—hue of 2.5YR, value of 4 or 5, and chroma of 6 or 8; or hue of 5YR, value of 4, and chroma of 6 or value of 5 and chroma of 6 or 8
Texture—sandy clay loam, clay loam, or loam
Content of rock fragments—0 to 10 percent by volume
Reaction—strong y acid or very strongly acid

BC horizon (where present):
Color—similar to the Bt horizon
Texture—fine sandy loam, loam, sandy clay loam, or their gravelly analogs
Content of rock fragments—0 to 25 percent by volume
Reaction—strongly acid or very strongly acid
Mottles—shades of gray, brown, or red

R layer:
Type of bedrock—unweathered, hard, level-bedded sandstone

Mountainburg Series

Depth class: Shallow
Drainage class: Well drained
Permeability: Moderately rapid
Parent material: Residuum from acid sandstone
Landform position: Mountaintops, ridgetops, and sideslopes
Commonly associated soils: Enders, Linker, and Nella
Slope range: 3 to 65 percent
Taxonomic class: Loamy-skeletal, siliceous, thermic Lithic Hapludults

Typical Pedon

Mountainburg stony fine sandy loam, in an area of Linker-Mountainburg complex, 3 to 8 percent slopes, NE¼SW¼SE¼ sec. 15, T. 4 N., R. 28 W.

A—0 to 4 inches; dark brown (10YR 3/3) stony fine sandy loam; weak fine granular structure; very friable; about 20 percent, by volume, sandstone fragments up to 24 inches in diameter; strongly acid; clear smooth boundary.
BA—4 to 9 inches; strong brown (7.5YR 5/6) gravelly fine sandy loam; weak medium granular structure; very friable; about 25 percent, by volume, sandstone fragments less than 5 inches in diameter; very strongly acid; clear smooth boundary.
Bt—9 to 16 inches; yellowish red (5YR 4/6) very gravelly sandy clay loam; weak moderate subangular blocky structure; friable; few faint clay films on faces of peds; about 45 percent, by volume, sandstone fragments less than 5 inches in diameter; very strongly acid; abrupt irregular boundary.
R—16 to 20 inches; level-bedded, hard, sandstone bedrock.

Range in Characteristics

Solum thickness: 12 to 20 inches
Depth to bedrock: 12 to 20 inches

A horizon:
Color—hue of 10YR, value of 3 or 4, and chroma of 2 or 3 or value of 5 and chroma of 2
Texture—stony fine sandy loam
Content of rock fragments—15 to 35 percent by volume
Reaction—moderately acid to very strongly acid

E horizon (where present):
Color—hue of 10YR, value of 4 or 5, and chroma of 3 or 4
Texture—gravelly fine sandy loam or cobbly fine sandy loam
Content of rock fragments—15 to 35 percent by volume
Reaction—moderately to very strongly acid

BA horizon:
Color—hue of 7.5YR, value of 4, and chroma of 4 or value of 5 and chroma of 4 or 6
Texture—gravelly fine sandy loam or cobbly fine sandy loam
Content of rock fragments—15 to 35 percent by volume
Reaction—moderately to very strongly acid

Bt horizon:
Color—hue of 7.5YR, value of 5, and chroma of 6; or hue of 5YR, value of 4 or 5, and chroma of 6 or 8
Texture—very gravelly fine sandy loam, very gravelly loam, very gravelly sandy clay loam, or their very cobbly analogs
Content of rock fragments—35 to 60 percent by volume
Reaction—strongly acid or very strongly acid

R layer:
Type of bedrock—unweathered, hard, level-bedded sandstone

Neff Series

Depth class: Very deep

Drainage class: Moderately well drained
Permeability: Moderately slow
Parent material: Loamy alluvium
Landform position: Flood plains
Commonly associated soils: Cupco, Rexor, and Spadra
Slope range: 0 to 2 percent
Taxonomic class: Fine-silty, siliceous, thermic Aquultic Hapludalfs

Typical Pedon

Neff silt loam, occasionally flooded, in a cultivated field, SW¼NW¼SW¼ sec. 28, T. 2 N., R. 28 W.

Ap—0 to 13 inches; brown (10YR 4/3) silt loam; weak fine granular structure; friable; many fine roots; few fine pores; strongly acid; clear smooth boundary.
BA—13 to 24 inches; brown (10YR 4/3) silt loam; few fine faint grayish brown (10YR 5/2) mottles; weak medium subangular blocky structure; friable; common fine roots; few fine pores; strongly acid; gradual smooth boundary.
Bt1—24 to 37 inches; dark grayish brown (10YR 4/2) silt loam; common medium distinct light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; friable; few faint clay films on faces of peds; common fine roots; common fine pores; strongly acid; gradual smooth boundary.
Bt2—37 to 59 inches; brown (10YR 5/3) silty clay loam; common medium faint grayish brown (10YR 5/2) mottles; weak medium subangular blocky structure; friable; few faint clay films on faces of peds; few fine roots; common fine pores; strongly acid; gradual smooth boundary.
BC—59 to 72 inches; yellowish brown (10YR 5/4) silt loam; many coarse distinct gray (10YR 6/2) mottles; weak medium subangular blocky structure; friable; common fine pores; strongly acid.

Range in Characteristics

Solum thickness: 60 to 80 inches or more
Depth to bedrock: >60 inches

A horizon:
Color—hue of 10YR, value of 4, and chroma of 2 to 4
Texture—silt loam
Reaction—moderately acid to very strongly acid
Mottles—shades of gray or brown

Bt horizon:
Color—hue of 10YR, value of 4 or 5, and chroma of 2 to 4
Texture—silt loam or silty clay loam
Reaction—moderately acid to very strongly acid
Mottles—shades of gray or brown

BC horizon:
Color—hue of 10YR, value of 4 or 5, and chroma of 3 or 4
Texture—silt loam or silty clay loam
Reaction—moderately acid to very strongly acid
Mottles—shades of brown and gray

Nella Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Parent material: Colluvium and residuum from acid sandstone and shale
Landform position: Sideslopes, footslopes, and benches of ridges and mountains
Commonly associated soils: Ceda, Enders, Kenn, Linker, and Mountainburg
Slope range: 3 to 40 percent
Taxonomic class: Fine-loamy, siliceous, thermic Typic Paleudults

Typical Pedon

Nella stony fine sandy loam, in an area of Nella-Enders complex, 20 to 40 percent slopes, SW¼NW¼SW¼ sec. 24, T. 4 N., R. 26 W.

A—0 to 4 inches; dark grayish brown (10YR 4/2) stony fine sandy loam; weak fine granular structure; friable; many fine and medium roots; few fine pores; about 20 percent, by volume, sandstone fragments up to 14 inches in diameter; strongly acid; clear smooth boundary.
E—4 to 8 inches; brown (10YR 5/3) cobbly fine sandy loam; weak fine granular structure; friable; many fine and medium roots; about 15 percent, by volume, sandstone fragments up to 8 inches in diameter; very strongly acid; clear smooth boundary.
BE—8 to 15 inches; strong brown (7.5YR 5/6) cobbly loam; weak medium subangular blocky structure; friable; common fine roots; few fine pores; about 15 percent, by volume, sandstone fragments up to 6 inches in diameter; very strongly acid; gradual smooth boundary.
Bt1—15 to 30 inches; yellowish red (5YR 5/6) clay loam; moderate medium subangular blocky structure; friable; few faint clay films on faces of peds; few fine roots; few fine pores; about 10 percent, by volume, sandstone fragments up to 6 inches in diameter; very strongly acid; gradual smooth boundary.
Bt2—30 to 52 inches; red (2.5YR 5/8) clay loam; moderate medium subangular blocky structure; friable; few faint clay films on faces of peds; about 10 percent, by volume, sandstone fragments up to 6

inches in diameter; very strongly acid; gradual smooth boundary.
Bt3—52 to 72 inches; red (2.5YR 4/6) cobbly clay loam; moderate medium subangular blocky structure; friable; few faint clay films on faces of peds; about 15 percent, by volume, sandstone fragments up to 8 inches in diameter; very strongly acid.

Range in Characteristics

Solum thickness: 60 to 80 inches or more
Depth to bedrock: >60 inches

A horizon:
Color—hue of 10YR, value of 4, and chroma of 2 or 3; in cultivated areas, hue of 10YR, value of 4, and chroma of 3 or value of 5 and chroma of 3 or 4
Texture—gravelly fine sandy loam, cobbly fine sandy loam, or stony fine sandy loam
Content of rock fragments—15 to 35 percent
Reaction—strongly acid or very strongly acid

E horizon:
Color—hue of 10YR, value of 5, and chroma of 3 or 4; or hue of 7.5YR, value of 5, and chroma of 4
Texture—gravelly fine sandy loam, gravelly loam, or their cobbly or stony analogs
Content of rock fragments—15 to 35 percent by volume
Reaction—strongly acid or very strongly acid

BE horizon:
Color—hue of 7.5YR, value of 5, and chroma of 6; or hue of 5YR, value of 5, and chroma of 4, 6, or 8
Texture—loam, clay loam, or their gravelly or cobbly analogs
Content of rock fragments—10 to 35 percent by volume
Reaction—strongly acid or very strongly acid

Bt horizon:
Color—hue of 5YR, value of 4, and chroma of 6 or value of 5 and chroma of 6 or 8; or hue of 2.5YR, value of 4 or 5, and chroma of 6 or 8
Texture—clay loam, sandy clay loam, or their gravelly or cobbly analogs
Content of rock fragments—10 to 35 percent by volume
Reaction—strongly acid or very strongly acid
Mottles—shades of brown

Octavia Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Parent material: Loamy colluvium over clayey residuum from shale
Landform position: Steep to very steep colluvial benches and footslopes
Commonly associated soils: Carnasaw, Caston, Clebit, and Sherless
Slope range: 15 to 60 percent
Taxonomic class: Fine-loamy, siliceous, thermic Typic Paleudults

Typical Pedon

Octavia very stony loam, in an area of Octavia-Carnasaw-Caston complex, 35 to 60 percent slopes, SE¼SE¼NW¼ sec. 9, T. 1 S., R. 27 W.

A—0 to 4 inches; dark grayish brown (10YR 4/2) very stony loam; weak fine granular structure; friable; many fine and medium roots; few fine pores; about 50 percent, by volume, sandstone fragments up to 14 inches in diameter; strongly acid; clear smooth boundary.
E—4 to 8 inches; yellowish brown (10YR 5/4) cobbly loam; weak fine granular structure; friable; many fine and medium roots; about 30 percent, by volume, sandstone fragments up to 12 inches in diameter; strongly acid; clear smooth boundary.
BE—8 to 13 inches; strong brown (7.5YR 5/6) loam; weak fine and medium subangular blocky structure; friable; common fine roots; few fine pores about 10 percent, by volume, sandstone fragments up to 6 inches in diameter; very strongly acid; clear smooth boundary.
Bt1—13 to 23 inches; yellowish red (5YR 5/6) clay loam; moderate medium subangular blocky structure; friable; few faint clay films on faces of peds; few fine roots; few fine pores; about 10 percent, by volume, sandstone fragments up to 6 inches in diameter; very strongly acid; clear smooth boundary.
Bt2—23 to 41 inches; yellowish red (5YR 5/8) clay loam; moderate medium subangular blocky structure; firm; few faint clay films on faces of peds; about 10 percent, by volume, sandstone fragments up to 6 inches in diameter; very strongly acid; clear wavy boundary.
2Bt3—41 to 72 inches; coarsely mottled yellowish red (5YR 5/8), red (2.5YR 4/6), and gray (10YR 6/1) clay; moderate medium subangular blocky structure; firm; many prominent thick clay films on faces of peds; about 10 percent, by volume, shale fragments less than 3 inches in diameter; very strongly acid.

Range in Characteristics

Solum thickness: 60 to 80 inches
Depth to bedrock: >60 inches

A horizon:
Color—hue of 10YR, value of 3 or 4, and chroma of 2 or 3
Texture—stony or very stony loam
Content of rock fragments—15 to 60 percent
Reaction—moderately acid or strongly acid

E horizon:
Color—hue of 10YR, value of 5 or 6, and chroma of 3 or 4
Texture—gravelly loam, cobbly loam, stony loam, or their very gravelly or very cobbly analogs
Content of rock fragments—15 to 60 percent
Reaction—moderately acid or strongly acid

BE horizon:
Color—hue of 7.5YR, value of 5, and chroma of 6 or 8
Texture—loam, gravelly loam, or cobbly loam
Content of rock fragments—5 to 35 percent
Reaction—strongly acid or very strongly acid

Bt horizons:
Color—hue of 5YR, value of 5, and chroma of 6 or 8 or value of 4 and chroma of 6; or hue of 2.5YR, value of 4 or 5, and chroma of 6 or 8
Texture—clay loam, sandy clay loam, or their gravelly analogs
Content of rock fragments—5 to 35 percent
Reaction—strongly acid or very strongly acid

2Bt horizon:
Color—hue of 5YR or 7.5YR, value of 5, and chroma of 6 or 8; or hue of 2.5YR, value of 4 or 5, and chroma of 6 or 8; or lack a dominant color and are in shades of brown, red, or gray
Texture—clay loam, clay, or their gravelly or channery analogs
Content of rock fragments—5 to 35 percent
Reaction—strongly acid or very strongly acid
Mottles—shades of red, brown, and gray

Rexor Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Parent material: Loamy alluvium
Landform position: Flood plains
Commonly associated soils: Cupco, Neff, and Spadra
Slope range: 0 to 3 percent
Taxonomic class: Silty, siliceous, thermic Ultic Hapludalfs

Typical Pedon

Rexor loam, frequently flooded, in a cultivated field, NE¼NW¼NW¼ sec. 33, T. 2 N., R. 28 W.

Ap—0 to 7 inches; brown (10YR 4/3) loam; weak fine granular structure; very friable; strongly acid; abrupt smooth boundary.
Bt1—7 to 37 inches; brown (7.5YR 4/4) silty clay loam; weak fine subangular blocky structure; friable; few faint clay films on faces of peds; strongly acid; clear smooth boundary.
Bt2—37 to 49 inches; brown (7.5YR 4/4/) silty clay loam; few medium faint brown (10YR 5/3) mottles; moderate medium subangular blocky structure; friable; few faint clay films on faces of peds; very strongly acid; clear smooth boundary.
BC—49 to 72 inches; brown (7.5YR 4/4) silt loam; common medium distinct grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; friable; strongly acid.

Range in Characteristics

Solum thickness: 60 to 80 inches
Depth to bedrock: >60 inches

A horizon:
Color—hue of 10YR or 7.5YR, value of 3 or 4, and chroma of 2 to 4
Texture—loam
Reaction—slightly acid to strongly acid

Bt horizon:
Color—hue of 10YR, value of 4 to 6, and chroma of 3 to 6; or hue of 7.5YR, value of 4 to 6, and chroma of 4 or 6
Texture—loam, silt loam, clay loam, or silty clay loam
Reaction—moderately acid to very strongly acid
Mottles—shades of brown or gray in the lower part

BC horizon:
Color—hue of 10YR, value of 4 to 6, and chroma of 3 to 6; or hue of 7.5YR, value of 4 or 6, and chroma of 4 to 6
Texture—loam or silt loam
Reaction—moderately acid to very strongly acid
Mottles—shades of brown, yellow, or gray

Sallisaw Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Parent material: Loamy valley fill
Landform position: Broad upland valleys
Commonly associated soils: Cane, Enders, Endsaw, Leadvale, and Taft
Slope range: 0 to 8 percent
Taxonomic class: Fine-loamy, siliceous, thermic Typic Paleudalfs

Typical Pedon

Sallisaw silt loam, 3 to 8 percent slopes in a pasture, SW¼SW¼NW¼ sec. 20, T. 2 N., R. 28 W.

Ap—0 to 5 inches; brown (7.5YR 4/4) silt loam; weak medium subangular blocky structure; friable; about 10 percent, by volume, rounded sandstone pebbles; many fine and medium roots; common fine and very fine pores; common rounded fine Fe-Mg concretions; moderately acid; clear smooth boundary.

BA—5 to 13 inches; yellowish red (5YR 4/6) loam; moderate medium subangular blocky structure; friable; about 10 percent, by volume, sandstone pebbles; common fine and medium roots; common medium and coarse pores; common fine rounded Fe-Mg concretions; some peds coated with Ap material in upper part of horizon; strongly acid; clear smooth boundary.

Bt1—13 to 22 inches; red (2.5YR 4/6) loam; moderate medium subangular blocky structure; friable; many faint clay films on faces of peds; about 10 percent, by volume, sandstone pebbles; common fine roots; common fine pores; common medium rounded Fe-Mg concretions; very strongly acid; clear smooth boundary.

Bt2—22 to 34 inches; red (2.5YR 4/6) clay loam; common medium prominent yellowish brown (10YR 5/4) and few fine prominent pale brown (10YR 6/3) mottles; moderate medium subangular blocky structure; firm; common distinct clay films on faces of peds; about 10 percent, by volume, sandstone pebbles; few fine roots; common fine pores; common medium rounded Fe-Mg concretions; very strongly acid; gradual smooth boundary.

Bt3—34 to 49 inches; mottled red (2.5YR 4/6), strong brown (7.5YR 5/6) and pale brown (10YR 6/3) clay loam; strong medium subangular blocky structure; firm; common faint clay films on faces of peds; about 10 percent, by volume, sandstone pebbles; few very fine roots; many coarse pores, some filled with fine sandy loam; many medium and coarse rounded and irregular shaped Fe-Mg concretions; very strongly acid; gradual smooth boundary.

2Bt4—49 to 60 inches; mottled red (2.5YR 4/6), light brownish gray (10YR 6/2), and strong brown (7.5YR 5/6) very gravelly clay loam; moderate fine angular blocky structure; firm, about 20 percent of peds slightly brittle; common distinct clay films on faces of peds; common medium pores; about 35 percent, by volume, sandstone pebbles; many medium rounded and irregular shaped Fe-Mg concretions; very strongly acid; gradual wavy boundary.

2Bt5—60 to 72 inches; mottled strong brown (7.5YR 5/6), light brownish gray (10YR 6/2), and red (2.5YR 4/6) very gravelly clay loam; weak medium subangular blocky structure; firm; common distinct clay films on faces of peds; few fine pores; about 60 percent, by volume, sandstone fragments up to 5 inches in diameter; few fine rounded Fe-Mg concretions very strongly acid.

Range in Characteristics

Solum thickness: 60 to 80 inches or more
Depth to bedrock: >60 inches

A horizon:
- Color—hue of 10YR, value of 4, and chroma of 2 to 4; or hue of 7.5YR, value of 4, and chroma of 4
- Texture—silt loam
- Content of rock fragments—0 to 15 percent by volume
- Reaction—slightly acid or moderately acid

BA horizon:
- Color—hue of 7.5YR, value of 4, and chroma of 4; or hue of 5YR, value of 4 or 5, and chroma of 4 or 6
- Texture—loam, silt loam, or clay loam
- Content of rock fragments—0 to 15 percent by volume
- Reaction—strongly acid or very strongly acid

Bt horizon:
- Color—hue of 5YR, value of 4, and chroma of 6 or value of 5 and chroma of 6 or 8; or hue of 2.5YR, value of 4 or 5, and chroma of 6 or 8; or lack a dominant color and are in shades of brown, red, or gray
- Texture—loam, silty clay loam, or clay loam, or their gravelly analogs
- Content of rock fragments—0 to 35 percent by volume
- Reaction—strongly acid or very strongly acid
- Mottles—shades of brown

2Bt horizon:
- Color—hue of 7.5YR, value of 5, and chroma of 6 or 8; hue of 5YR, value of 4 or 5, and chroma of 6; or hue of 2.5YR, value of 4, and chroma of 6; or lack a dominant color and are in shades of brown, red, or gray
- Texture—very gravelly silty clay loam or very gravelly clay loam
- Content of rock fragments—35 to 60 percent by volume
- Reaction—strongly acid or very strongly acid
- Mottles—shades of red, brown, or gray

Sherless Series (fig. 13)

Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderate

Figure 13.—Typical pedon of Sherless gravelly fine sandy loam. This soil formed in loamy residuum from sandstone and shale. Depth is marked in feet.

Parent material: Residuum of interbedded sandstone and shale
Landform position: Gently sloping to very steep sideslopes of ridges and mountains
Commonly associated soils: Carnasaw, Ceda, Clebit, Kenn, and Octavia
Slope range: 3 to 60 percent
Taxonomic class: Fine-loamy, mixed, thermic Typic Hapludults

Typical Pedon

Sherless stony fine sandy loam, in an area of Carnasaw-Sherless-Clebit complex, 20 to 35 percent slopes, SE¼SE¼NW¼ sec. 32, T. 1 N., R. 30 W.

A—0 to 3 inches; dark grayish brown (10YR 4/2) stony fine sandy loam; weak fine granular structure; friable; common fine roots; few fine pores; about 20 percent, by volume, sandstone fragments up to 24 inches in diameter; strongly acid; clear smooth boundary.
E—3 to 7 inches; yellowish brown (10YR 5/4) fine sandy loam; weak fine subangular blocky structure; friable; few fine roots; common fine pores; about 5 percent, by volume, sandstone fragments up to 3 inches in diameter; strongly acid; clear smooth boundary.
Bt1—7 to 17 inches; strong brown (7.5YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable; few faint clay films on faces of peds; about 5 percent, by volume, sandstone fragments up to 3 inches in diameter; very strongly acid; clear wavy boundary.
Bt2—17 to 27 inches; strong brown (7.5YR 5/6) gravelly sandy clay loam; moderate medium subangular blocky structure; friable; few faint clay films on faces of peds; about 15 percent, by volume, of red, strongly weathered sandstone fragments ¼ inch to 3 inches in diameter; very strongly acid; clear irregular boundary.
Cr—27 to 40 inches; soft, tilted, platy, sandstone bedrock with lenses of shale.

Range in Characteristics

Solum thickness: 20 to 40 inches
Depth to bedrock: 20 to 40 inches

A horizon:
Color—hue of 10YR, value of 3 or 4, and chroma of 2 or 3
Texture—gravelly fine sandy loam, cobbly fine sandy loam, or stony fine sandy loam
Content of rock fragments—15 to 35 percent by volume
Reaction—moderately acid or strongly acid

E horizon:
Color—hue of 10YR, value of 5 or 6, and chroma of 4
Texture—gravelly fine sandy loam or fine sandy loam
Content of rock fragments—5 to 30 percent by volume
Reaction—moderately acid or strongly acid

BE horizon (where present):
Color—hue of 10YR or 7.5YR, value of 5, and chroma of 6 or 8
Texture—loam, fine sandy loam, or their gravelly analogs
Content of rock fragments—5 to 25 percent by volume
Reaction—strongly acid or very strongly acid

Bt horizon:
Color—hue of 5YR or 7.5YR, value of 5, and chroma of 6 or 8
Texture—clay loam, sandy clay loam, or their gravelly analogs
Content of rock fragments—5 to 25 percent by volume
Reaction—strongly acid or very strongly acid

Cr layer:
Type of bedrock—weathered, soft, tilted, interbedded sandstone and shale

Spadra Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Parent material: Loamy alluvium
Landform position: Low stream terraces along larger streams
Commonly associated soils: Ceda, Cupco, Kenn, Neff and Rexor
Slope range: 0 to 3 percent
Taxonomic class: Fine-loamy, siliceous, thermic Typic Hapludults

Typical Pedon

Spadra fine sandy loam, occasionally flooded, in a pasture, SE¼SE¼NE¼ sec. 8, T. 1 N., R. 32 W.

Ap—0 to 8 inches; brown (7.5YR 4/4) fine sandy loam; weak fine granular structure; friable; many fine roots; common fine pores; about 2 percent, by volume, sandstone fragments less than 3 inches in diameter; strongly acid; abrupt smooth boundary.
Bt1—8 to 15 inches; yellowish red (5YR 4/6) loam; weak fine subangular blocky structure; friable; few faint clay films on faces of peds; many fine roots; common fine pores; about 2 percent, by volume, sandstone fragments less than 3 inches in diameter; moderately acid; clear smooth boundary.
Bt2—15 to 28 inches; yellowish red (5YR 5/6) sandy clay loam; moderate medium subangular blocky structure; friable; few faint clay films on faces of peds; many fine roots; common fine pores; about 2 percent, by

volume, sandstone fragments 3/4 inch to 3 inches in diameter; very strongly acid; gradual smooth boundary.

Bt3—28 to 38 inches; yellowish red (5YR 5/6) sandy clay loam; moderate medium subangular blocky structure; friable; few faint clay films on faces of peds; few fine roots; common fine pores; about 5 percent, by volume, sandstone fragments 3/4 inch to 3 inches in diameter; strongly acid; clear smooth boundary.

BC—38 to 54 inches; strong brown (7.5YR 5/6) fine sandy loam; weak medium subangular blocky structure; friable; few fine roots; common fine pores; about 10 percent, by volume, rounded sandstone fragments 3/4 inch to 3 inches in diameter; strongly acid; gradual smooth boundary.

C—54 to 72 inches; yellowish brown (10YR 5/4) gravelly loam; massive; friable; few fine roots; common fine pores; about 20 percent, by volume, sandstone fragments 3/4 inch to 3 inches in diameter; very strongly acid.

Range in Characteristics

Solum thickness: 40 to 60 inches
Depth to bedrock: >60 inches

A horizon:
- Color—hue of 10YR, value of 4, and chroma of 3 or 4; or hue of 7.5YR, value of 4, and chroma of 4
- Texture—fine sandy loam
- Content of rock fragments—0 to 10 percent by volume
- Reaction—moderately acid to very strongly acid

Bt horizon:
- Color—hue of 5YR, value of 4 or 5, and chroma of 4 or 6 or value of 3 and chroma of 4; or hue of 7.5YR, value of 4, and chroma of 4
- Texture—loam or sandy clay loam
- Content of rock fragments—0 to 5 percent by volume
- Reaction—moderately acid to very strongly acid

BC horizon:
- Color—hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 4 or 6
- Texture—loam, sandy loam, fine sandy loam, or their gravelly analogs
- Content of rock fragments—0 to 20 percent by volume
- Reaction—moderately acid to very strongly acid

C horizon:
- Color—hue of 7.5YR, value of 4 or 5, and chroma of 4 or 6; or hue of 10YR, value of 4 or 5, and chroma of 4
- Texture—loam, sandy loam, fine sandy loam, or their gravelly analogs
- Content of rock fragments—0 to 20 percent by volume
- Reaction—moderately acid to very strongly acid

Taft Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Slow
Parent material: Loamy sediments from interbedded sandstone and shale bedrock
Landform position: Broad upland valleys
Commonly associated soils: Cane, Leadvale, and Sallisaw
Slope range: 0 to 2 percent
Taxonomic class: Fine-silty, siliceous, thermic Glossaquic Fragiudults

Typical Pedon

Taft silt loam, 0 to 2 percent slopes, in an idle area, NW1/4SW1/4NW1/4 sec. 29, T. 2 N., R. 28 W.

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable; many fine roots; few fine pores; strongly acid; clear smooth boundary.

Bw—7 to 20 inches; yellowish brown (10YR 5/4) silt loam; common medium faint light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; friable; common fine roots; few fine pores; strongly acid; clear smooth boundary.

E—20 to 24 inches; grayish brown (10YR 5/2) silt loam; common medium faint light yellowish brown (10YR 5/4) mottles; weak medium subangular blocky structure; friable; common fine dark concretions; common fine pores; very strongly acid; clear irregular boundary.

Btx/E—24 to 58 inches; (Btx) mottled yellowish brown (10YR 5/6) and light gray (10YR 6/1) silty clay loam; weak coarse prismatic structure parting to moderate medium subangular blocky; about 70 percent of the matrix is compact and brittle; few faint clay films on faces of peds and in pores; (E) common gray (10YR 6/1) silt loam vertical veins 1/2 inch to 2 inches in diameter which makes up about 15 percent of the total volume; massive; common fine pores throughout; common medium concretions throughout; very strongly acid; gradual smooth boundary.

Bt—58 to 72 inches; light yellowish brown (10YR 6/4) silty clay loam; many medium distinct light gray (10YR 6/1) mottles; moderate medium subangular blocky structure; friable; common prominent clay films on faces of peds; common medium dark concretions; strongly acid.

Range in Characteristics

Solum thickness: 50 to 72 inches or more
Depth to bedrock: >60 inches
Depth to fragipan: 20 to 36 inches

A horizon:
Color—hue of 10YR, value of 4, and chroma of 2 or value of 5 and chroma of 3
Texture—silt loam
Reaction—strongly acid or very strongly acid

Bw horizon:
Color—hue of 10YR, value of 5 or 6, and chroma of 3 or 4
Texture—Silt loam or silty clay loam
Reaction—strongly acid or very strongly acid
Mottles—shades of medium gray

E horizon:
Color—hue of 10YR, value of 5 or 6, and chroma of 1 or 2
Texture—silt loam or silt
Reaction—strongly acid or very strongly acid
Mottles—shades of brown

Btx horizon:
Color—hue of 10YR, value of 5, and chroma of 4; or hue of 2.5Y, value of 5 or 6, and chroma of 4; or lack a dominant color and are in shades of brown, gray, or yellow
Texture—si t loam or silty clay loam
Reaction—strongly acid or very strongly acid
Mottles—shades of gray, yellowish brown, or brown

Bt horizon:
Color—nue of 10YR, 7.5YR, or 5YR; value of 5 or 6; and chroma of 4 or 6
Texture—silty clay loam or silty clay
Reaction—strongly acid or very strongly acid
Mottles—shades of gray, brown, or yellow

*Udorthents

*See map unit description

Wilburton Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Parent material: Loamy, gravelly, and cobbly sediments
Landform position: Upland va .eys
Commonly associated soils: Avilla, Ceda and Kenn
Slope range: 1 to 8 percent
Taxonomic class: Loamy-skeletal, siliceous, thermic Ultic Hapludalfs

Typical Pedon

Wilburton very cobbly loam, 1 to 8 percent slopes, in a wooded area, SW¼NE¼NW¼ sec. 34, T. 1 N., R. 30 W.

A—0 to 7 inches; brown (10YR 4/3) very cobbly loam; weak fine granular structure; very friable; many fine and medium roots; common fine pores; about 50 percent, by volume, sandstone rock fragments up to 10 inches in diameter; strongly acid; abrupt smooth boundary.

BA—7 to 15 inches; brown (7.5YR 4/4) very cobbly loam; weak fine subangular blocky structure; friable; many fine and medium roots; common fine pores; about 40 percent, by volume, sandstone rock fragments up to 10 inches in diameter; strongly acid; clear smooth boundary.

Bt1—15 to 24 inches; yellowish red (5YR 5/6) very cobbly loam; moderate fine and medium subangular blocky structure; friable; common fine and medium roots; common fine pores; few faint clay films on faces of peds; about 50 percent, by volume, sandstone rock fragments up to 10 inches in diameter; very strongly acid; gradual smooth boundary.

Bt2—24 to 38 inches; yellowish red (5YR 5/6) very cobbly sandy clay loam; moderate fine and medium subangular blocky structure; friable; common fine and medium roots; common fine pores; few faint clay films on faces of peds; about 60 percent, by volume, sandstone rock fragments up to 10 inches in diameter; very strongly acid; gradual smooth boundary.

BC—38 to 53 inches; strong brown (7.5YR 5/6) extremely cobbly sandy clay loam; moderate medium subangular blocky structure; friable; common fine roots; common fine pores; about 60 percent, by volume, sandstone cobbles up to 10 inches in diameter; very strongly acid; gradual wavy boundary.

C—53 to 72 inches; strong brown (7.5YR 5/6) extremely cobbly loam; massive; friable; about 60 percent, by volume, sandstone rock fragments up to 10 inches in diameter; strongly acid.

Range in Characteristics

Solum thickness: 40 to 60 inches or more
Depth to bedrock: >60 inches

A horizon:
Color—hue of 10YR, value of 4 or 5, and chroma of 2 to 4
Texture—very cobbly loam
Content of rock fragments—35 to 60 percent by volume
Reaction—moderately acid or strongly acid

BA horizon:
Color—hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 4 or 6
Texture—very cobbly fine sandy loam or very cobbly loam

Content of rock fragments—35 to 60 percent by volume
Reaction—moderately acid or strongly acid

Bt horizon:
Color—hue of 5YR, value of 4, and chroma of 6 or value of 5 and chroma of 6 or 8; or hue of 7.5YR, value of 5, and chroma of 6
Texture—very cobbly loam, very cobbly sandy clay loam, or their extremely cobbly analogs
Content of rock fragments—45 to 75 percent
Reaction—strongly acid or very strongly acid

BC horizon:
Color—hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 4 or 6
Texture—very cobbly loam, very cobbly sandy clay loam, or their extremely cobbly analogs
Content of rock fragments—55 to 80 percent by volume
Reaction—strongly acid or very strongly acid

C horizon:
Color—hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 or 6
Texture—very cobbly loam, very cobbly clay loam, very cobbly sandy clay loam, or their extremely cobbly analogs
Content of rock fragments—55 to 80 percent by volume
Reaction—moderately acid or strongly acid
Mottles—shades of brown, yellow, and gray

Formation of the Soils

Factors of Soil Formation

Soil is formed by weathering and other processes that act upon the parent material. The characteristics of the soil at any given point depend upon climate, living organisms, parent material, relief, and time. Each factor acts on the soil and modifies the effect of the other four. When climate, living organisms, or any of the other five factors is varied to a significant extent, a different soil may be formed.

Climate and living organisms are the active forces in soil formation. Relief modifies the effects of climate and living organisms, mainly by its influence on temperature and runoff. Because climate, vegetation, parent material, and relief interact over a period of time, the effect of time is also reflected in the soil characteristics. The interaction of the five factors of soil formation is more complex for some soils than for others.

Climate

From an overall standpoint, climate is perhaps the most influential factor of soil formation in Scott County. To a great extent it determines the nature of the weathering that occurs. For example, temperature and precipitation directly influence the rate of chemical and physical processes. These processes, in turn, directly influence the rate of soil profile development.

The climate of Scott County is characterized by warm summers, mild winters, and fairly abundant rainfall. The present climate is probably similar to the climate that influenced soil formation in the past. For additional information about climate, refer to the section "General Nature of the County."

The warm, moist climate promotes rapid soil formation and encourages rapid chemical reactions. The large amount of water that moves through the soil is instrumental in moving dissolved or suspended material downward in the soil profile. Plant remains decompose rapidly, and the organic acid that forms hastens the removal of carbonates and the formation of clay minerals.

Because the soil is frozen only to a shallow depth and for a relatively short period, soil formation continues almost year round. The climate throughout the county is relatively uniform, but its effect is modified locally by elevation, slope steepness, and slope aspect. Climate alone does not account for differences in the soils of the county.

Living Organisms

Plants and animals, including insects, bacteria, and fungi, are important in the formation of soils. Among the changes they cause are additions of organic matter and nitrogen in the soil, additions or losses in plant nutrients, and changes in soil structure and porosity.

Before Scott County was settled, the native vegetation had more influence on soil formation than did animal activity.

The level to gently sloping areas in the broad valleys supported a growth of tall bunch grasses and hardwood trees. Leadvale and Taft soils formed in these areas. These soils, however, do not have the thick, dark-color surface layer commonly associated with soils formed under this type of vegetation. Apparently, their characteristics were influenced more by parent material, climate, and relief than by vegetation.

In the narrow valleys and along the streams in the sloping and hilly parts of the county, the native trees were mixed pines and hardwoods. Cane, Leadvale, Neff, Sallisaw, and Spadra soils formed in these areas. These soils are very deep, and they differ chiefly in age, relief, and degree of weathering.

On ridges and low hills within the broad valleys, the native vegetation was savannas of scattered hardwoods, cedars, and pines that had an understory of tall grasses. Endsaw, Linker, and Mountainburg soils formed in these areas. These soils differ chiefly in age and degree of weathering.

The native vegetation in most of the mountainous areas of the county consisted of forests of oaks, hickory, redcedar, and shortleaf pine. Only the upper few inches of the soils in these areas have a significant accumulation of organic matter and a dark colored surface layer. Carnasaw, Clebit, Enders, Linker, Nella, Mountainburg, Octavia, and Sherless soils formed on these uplands. These soils differ chiefly in age, degree of weathering, relief, and kind of parent material.

Differences in native vegetation in the county are related partly to variations in the available water capacity

and in the surface and internal drainage of the soils. Slope aspect and soil fertility also cause minor variations. Only the major differences in the original vegetation are reflected to any extent in the characteristics of the soils.

People are important to the future rate and direction of soil formation. They clear the forests, cultivate the soils, and introduce new kinds of plants. Fertilizers, lime, and chemicals for insect, disease, and weed control are added to the soil. Constructing levees and dams for flood control, improving drainage, and grading the soil surface also effect the development of soils. Some results of these changes will not be evident for many centuries; nevertheless, the effects of living organisms on soil formation in Scott County has been drastically changed by these activities.

Parent Material and Geology

The acid sandstone and shales that underlie most of Scott County were deposited in marine waters during the Pennsylvanian and Mississippian periods. These sedimentary rocks are of various textures. They range from rather coarse-grained sandstones to shaley sandstones to clayey shales. The geologic formations in the county are the Stanley Shale, Jackfork Sandstone, Johns Valley Shale, Atoka Formation, Hartshorne Sandstone, McAlester Formation, and Savanna Formation.

The northern one-third of the county is in the Arkansas Valley and Ridges Major Land Resource Area. This area is characterized by level-bedded sandstone and shale bedrock.

The Savanna Formation is the youngest and overlies the McAlester Formation. It consists principally of sandstone and sandy shale. The weathered material is mostly sandy and is yellowish to reddish. Mountainburg and Linker soils are the principal residual soils that formed in this material.

The McAlester Formation rests on the Hartshorne Sandstone Formation. This formation consists of shales with sandstones. It outcrops on the sides of some hills and in some valley floors. Where this formation outcrops, Enders and Nella soils formed in its weathered material.

The Hartshorne Sandstone Formation rests on the Atoka Formation and is of minor extent. This formation is composed of sandstone and sandy shales. It weathers into material from which Mountainburg and Linker soils are formed. The sandstone is medium grained and well cemented.

The divided Atoka Formation rests on the Johns Valley Shale Formation and is extensive throughout the county. This formation is dominantly interbedded shale, but it also has thin bedded sandstone. In the northern one-third of the county, this shale and sandstone is level-bedded and weathers into material in which Enders and Nella soils formed. Mountainburg and Linker soils formed where the sandstone caps the ridges.

The southern two-thirds of Scott County is in the Ouachita Mountain Major Land Resource Area. This area is characterized by shale and sandstone bedrock tilted about 30 degrees from horizontal. The Atoka Formation, except for the upper part, continues into this part of the county. This formation is mainly tilted interbedded acid shale and sandstone; the shale is dominant. It weathers into material from which Carnasaw, Octavia, Sherless, and Clebit soils are formed.

The Johns Valley Shale Formation rests on the Jackfork Sandstone Formation and is of moderate extent. This formation is mainly in the south-central part of the county. It is tilted, acid shale that has thin interbedded layers of sandstone. It weathers into material from which Carnasaw and Sherless soils are formed.

The Jackfork Sandstone Formation rests on the Stanley Shale Formation and is of moderate extent. This formation is in the southern part of the county. It consists of tilted interbedded sandstone and shale. The sandstone is most prominent as rock outcrops and sandstone caps on ridgetops. This formation weathers into material from which Carnasaw, Octavia, Sherless, and Clebit soils are formed.

The Stanley Shale Formation is in the extreme southwest part of the county and is of minor extent. It consists mainly of soft, tilted, thin layers of interbedded sandstone and shale. This formation weathers into material from which Carnasaw, Sherless, and Bismarck soils are formed.

The Kenn, Ceda, Cupco, Neff, and Spadra soils are on flood plains and low stream terraces of upland drainageways. These soils formed in loamy sediment washed from local uplands.

The Cane, Leadvale, Sallisaw, and Taft soils formed on the valley terraces. These soils have well developed horizons that formed in loamy local sediment.

The Nella soils are on benches along the mountainsides. They formed in friable, loamy, and silty material that washed or rolled down from uplands. These soils are deep, medium textured, acid, and well drained. In many places, the surface of these soils is stony or gravelly because of sandstone fragments that have rolled down from the caprock bluffs above.

Relief

The relief, or topography, of the land can increase or slow down the work of climatic forces. In smooth, flat areas, excess water is removed at a slower rate than on a rolling landscape. More water reaches the soil to aid in soil profile development. The rolling topography encourages

more surface runoff and some natural erosion of the surface layer. If the runoff and erosion is extensive, the formation of a deep soil is prevented. The role of relief in the process of soil formation is primarily one of modifying the effects of the climate and vegetative factors.

The relief in Scott County has been brought about chiefly by faulting, folding, and the subsequent entrenchment of drainage channels into the land surface. The highest recorded elevation in the county, about 2,670 feet above sea level, is atop Poteau Mountain in the northwestern part of the county within the boundary of the Ouachita National Forest. The lowest elevation, about 455 feet above sea level, is in the eastern part of the county along the Fourche LaFave River.

Some of the greatest differences in the soils of Scott County are caused by differences in relief through its effect on drainage, runoff, erosion, and percolation of water through the soil. The landscape ranges from near vertical bluffs to broad flats.

The soils on steeper slopes and narrow ridges are generally shallow, because they have lost so much soil material through geologic erosion. Examples are the Mountainburg and Clebit soils. In contrast, broad areas of the nearly level or gently sloping soils have lost little soil material, and the soils are moderately deep or deep. Examples are Linker and Leadvale soils.

Deep accumulations of material that washed or slid down from adjoining steep slopes are in coves and on footslopes. The Nella soils are in such areas. In places where rocks have broken off and rolled downslope, these soils are stony.

The Taft soil is in the level to depressional areas in the broad valleys. Surface drainage is slow or ponded, and the soils are somewhat poorly drained. Permeability is slow. The soils are gray or have gray mottles because of the reduction of iron. They also have a seasonal perched high water table.

Time

The time required for soil formation depends largely on other factors of soil formation. Less time generally is required if the climate is warm and humid and the vegetation luxuriant. If other factors are equal, less time is also required if the parent material is loamy than if it is clayey.

In terms of geological time, most of the soils of Scott County are old, regardless of whether they are on mountaintops, mountainsides, or stream terraces. The young soils are along streams and rivers.

The soils on uplands are old. They formed in material weathered from sandstone and shale of Pennsylvanian age. Most of these soils are old enough that nearly all of the bases have been leached out. The reaction is strongly acid or very strongly acid. Considerable weathering and translocation of clay has occurred, and the horizons are clearly expressed. Iron, as well as clay, has been translocated from the A horizon to the B horizon and then oxidized, giving the B horizon stronger red, brown, and yellow colors than the A horizon. Enders, Endsaw, and Linker soils clearly show the impact of time acting with other soil-forming factors on parent material.

The Ceda soils are examples of young soils. They formed in recent alluvium on the flood plains of local streams. No definite horizons have formed below the A horizon. Instead, these soils still have the depositional rock structure, or bedding planes, and little or no soil structure. Base saturation is relatively high, and the reaction is slightly acid or moderately acid, indicating that leaching has been slight. Except for the slight changes caused by worms and roots, there is little evidence of soil-forming activity.

Neff and Spadra soils are intermediate in age. They formed in silty alluvium on flood plains and low terraces of large streams. Horizonation is weakly expressed, but there is evidence of clay translocation.

Processes of Soil Formation

The effects of the soil-forming factors are reflected in the soil profile. The soil profile is a succession of layers, or horizons, from the surface to the parent material. These horizons differ in one or more properties, such as color, texture, structure, consistency, and porosity.

Most soil profiles contain three major horizons—the A, B, and C horizons. Some soils also have an E horizon where clay and iron have been removed. Very young soils do not have a B horizon.

The horizon of maximum accumulation of organic matter is called the A horizon, or the surface layer. An Ap horizon is a plowed surface layer. The horizon of maximum leaching of dissolved or suspended material is called the E horizon, or the subsurface layer.

The B horizon, or subsoil, is below the A or E horizon. It is the horizon of maximum accumulation of suspended material, such as clay and iron. Commonly, the B horizon has blocky structure and is firmer than the horizons immediately above or below it.

The C horizon is below the B horizon. It is affected little by the soil-forming processes, but it can be materially modified by weathering. In some young soils, the C horizon immediately underlies the A horizon and has been slightly modified by living organisms as well as weathering.

In this survey area, several processes have been active in the formation of soil horizons. These processes are the accumulation of organic matter, the leaching of bases, the oxidation or reduction and transfer of iron, and the

formation and translocation of silicate clay minerals. In most of the soils, more than one of these processes were involved.

Physical weathering of rocks, through heating and cooling and wetting and drying, slowly breaks the rocks into small pieces that form the parent material of residual soils. The effects of weathering are most evident in Linker, Mountainburg, and Sherless soils.

The accumulation of organic matter in the upper part of the profile (A horizon) is readily evident in Nella soils. These soils have a light-color subsurface layer from which organic matter, clay, and iron oxides have been removed.

Leaching of bases has occurred to some degree in nearly all of the soils in the survey area. Soil scientists generally agree that bases are leached downward in soils before silicate clay minerals begin to move. Most of the soils in the county are moderately leached. Ceda soils are only slightly leached, and Carnasaw, Enders, Endsaw, Linker, Mountainburg, and Sherless soils are strongly leached.

Oxidation of iron is evident in the moderately well drained and well drained soils in the county. Red and brown colors in the B horizon of the Carnasaw, Linker, Mountainburg, Enders, Endsaw, Leadvale, and Sherless soils indicate the oxidation of iron.

The reduction and transfer of iron is apparent in the somewhat poorly drained soils. In the naturally wet soils, this process is called gleying. The gray colors in the horizons below the surface layer indicate the reduction and loss of iron. Some horizons contain red or yellow accumulations and concretions derived from segregated iron. Gleying is most pronounced in the Taft soils.

Translocation of silicate clay minerals has contributed to horizon development in most of the soils in the county. In cultivated areas, most of the elevated E horizon has been destroyed. Where the E horizon remains distinct, it generally has weak subangular blocky structure, has less clay than the lower horizons, and is lighter in color than the rest of the soil. Clay films generally have accumulated in pores and on the surface of peds in the B horizon. The soils were probably leached of carbonates and soluble salts to a great extent before translocation of silicate clay occurred, even though the content of bases is still higher in some of the soils on lowlands.

Leaching of bases and translocation of silicate clay are among the most important processes in horizon differentiation in the soils in the survey area.

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Glossary

ABC soil. A soil having an A, a B, and a C horizon.

AC soil. A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep, rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Colluvium. Soil material, rock fragments, or both moved

by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are:
Loose.—Noncoherent when dry or moist; does not hold together in a mass.
Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.
Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.
Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.
Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.
Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.
Soft.—When dry, breaks into powder or individual grains under very slight pressure.
Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:
Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.
Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.
Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.
Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum or periodically receive high rainfall, or both.
Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer,

a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.
Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.
Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.
Erosion (geologic)—Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.
Erosion (accelerated)—Erosion much more rapid than geologic erosion, mainly as a result of the human or animal activities or of a catastrophe in nature, such as fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Excess salt (in tables). Excess water-soluble salts in the soil that restrict the growth of most plants.

Fallow. Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grains are grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fast intake (in tables). The movement of water into the soil is rapid.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fine textured soil. Sandy clay, silty clay, or clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Footslope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant that is not a grass or a sedge.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Frost action (in tables). Freezing and thawing of soil moisture can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.6 centimeters) in diameter.

Ground water (geology). Water filling all the unblocked pores of the material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by

ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the "Soil Survey Manual." The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is, in part, a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as accumulation of clay, sesquioxides, humus, or a combination of these; prismatic or blocky structure; redder or browner colors than those in the A horizon; or a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Consolidated rock (unweathered bedrock) beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material. This contrasts with percolation, which is movement of water through soil layers or material.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Controlled flooding.—Water is released at intervals

from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Large stones (in tables). Rock fragments that are 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent.* The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Munsell notation. A designation of color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan.*

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called ""a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affects the specified use.

Permeability. The quality of the soil that enables water to move through the profile. Permeability is measured as the number of inches per hour that water moves through the saturated soil. Terms describing permeab ity are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Subsurface tunnels or pipelike cavities are formed by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plinthite. The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents. It commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade. It is a form of laterite.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Rangeland. Land on which the potential climax vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

Reaction, soil. A measure of the acidity or alkalinity of a soil expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Slightly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rippable. Rippable bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 drawbar horsepower rating.

Ripping. A mechanical site preparation method utilizing a D-8 tractor to pull one or more steel shanks through the soil (with the contour of the land) to a depth of 18 to 24 inches. This facilitates planting in cobbly and stony soils and improves micro-site conditions for increased seedling survival and growth.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Saline soil. A soil containing soluble salts in an amount that impairs the growth of plants. A saline soil does not contain excess exchangeable sodium.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Saprolite (soil science). Unconsolidated, residual material underlying the soil and grading to hard bedrock below.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind erosion and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind erosion and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the E horizon. Generally refers to a leached horizon lighter in color and lower in organic matter content than the overlying surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4

to 10 inches (10 to 25 centimeters). Frequently designated as the ""plow layer," or the ""Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed on the contour or at a slight angle to the contour across sloping soils. The terrace intercepts surface runoff, so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay.* The sand, loamy sand, and sandy loam classes may be further divided by specifying ""coarse," ""fine," or ""very fine."

Thin layer (in tables). An otherwise suitable soil material that is too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Toxicity (in tables). An excessive amount of toxic substances in the soil, such as sodium or sulfur, severely hinders the establishment of vegetation or severely restricts plant growth.

Trace elements. Chemical elements, such as zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Variegation. Refers to patterns of contrasting colors that are assumed to be inherited from the parent material rather than to be the result of poor drainage.

Weathering. All physical and chemical changes produced by atmospheric agents in rocks or other deposits at or near the earth's surface. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded at Waldron, Arkansas)

Month	Temperature 1951-1984						Precipitation 1961-1990				
				2 years in 10 will have--				3 years in 10 will have--			
	Average daily maximum	Average daily minimum	Average daily	Maximum temperature higher than--	Minimum temperature lower than--	Average number of growing degree days*	Average	Less than--	More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January-----	52.5	26.7	39.6	75	0	28	2.37	1.30	2.90	4	3.5
February----	57.5	30.8	44.2	79	7	45	3.05	1.96	3.67	5	2.3
March-------	65.5	38.5	52.0	86	16	172	4.43	3.13	5.25	6	.3
April-------	75.9	48.5	62.2	90	26	370	4.54	2.96	5.46	6	.0
May---------	82.8	56.6	69.7	94	36	611	6.10	3.81	7.37	7	.0
June--------	90.2	64.3	77.3	100	47	819	4.32	2.44	5.26	5	.0
July--------	95.0	67.5	81.3	106	53	970	4.04	2.39	4.91	5	.0
August------	94.3	65.9	80.1	105	52	933	3.08	2.27	3.78	5	.0
September---	87.6	58.9	73.3	100	38	699	4.08	2.42	4.95	5	.0
October-----	77.5	47.2	62.4	94	26	384	3.88	1.74	4.90	4	.0
November----	64.3	37.1	50.7	83	13	109	3.97	2.28	4.83	5	.3
December----	55.6	30.2	42.9	76	6	35	4.06	2.42	4.92	5	.4
Yearly:											
Average	74.9	47.7	61.3	---	---	---	---	---	---	---	---
Extreme	---	---	---	107	6	---	---	---	---	---	---
Total------	---	---	---	---	---	5,175	47.92	40.57	52.22	62	6.8

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area 50 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

(Recorded in the period 1951-84 at Waldron, Arkansas)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	March 30	April 12	April 24
2 years in 10 later than--	March 25	April 7	April 19
5 years in 10 later than--	March 16	March 28	April 10
First freezing temperature in fall			
1 year in 10 earlier than--	October 28	October 19	October 13
2 years in 10 earlier than--	November 2	October 24	October 17
5 years in 10 earlier than--	November 12	November 2	October 25

TABLE 3.--GROWING SEASON

(Recorded in the period 1951-84 at Waldron, Arkansas)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	218	198	181
8 years in 10	226	205	187
5 years in 10	240	218	198
2 years in 10	255	230	209
1 year in 10	263	237	214

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
AvB	Avilla silt loam, 1 to 3 percent slopes	6,050	1.1
AvC	Avilla silt loam, 3 to 8 percent slopes	2,630	0.5
CaC	Cane fine sandy loam, 3 to 8 percent slopes	90	*
CbD	Carnasaw stony silt loam, 3 to 15 percent slopes	5,605	1.0
CCF	Carnasaw-Octavia complex, 15 to 35 percent slopes	2,395	0.4
CDC	Carnasaw-Sherless complex, 3 to 8 percent slopes	22,165	3.9
CDE	Carnasaw-Sherless complex, 8 to 20 percent slopes	72,555	12.6
CDF	Carnasaw-Sherless complex, 20 to 35 percent slopes	100,477	17.5
CNC	Carnasaw-Sherless-Clebit complex, 3 to 8 percent slopes	4,095	0.7
CNE	Carnasaw-Sherless-Clebit complex, 8 to 20 percent slopes	24,820	4.3
CNF	Carnasaw-Sherless-Clebit complex, 20 to 35 percent slopes	43,615	7.6
Cr	Ceda very cobbly loam, frequently flooded	1,795	0.3
CSG	Clebit-Sherless-Carnasaw complex, 35 to 60 percent slopes	5,290	0.9
Cu	Cupco silt loam, occasionally flooded	3,140	0.5
EdC	Enders gravelly silt loam, 3 to 8 percent slopes	1,655	0.3
EdE	Enders gravelly silt loam, 8 to 20 percent slopes	5,025	0.9
EdF	Enders stony silt loam, 20 to 40 percent slopes	730	0.1
EME	Enders-Mountainburg complex, 8 to 20 percent slopes	28,720	5.0
EMF	Enders-Mountainburg complex, 20 to 40 percent slopes	32,670	5.7
EMG	Enders-Mountainburg complex, 40 to 65 percent slopes	10,520	1.8
EwC	Endsaw gravelly loam, 3 to 8 percent slopes	2,820	0.5
EwE	Endsaw cobbly loam, 8 to 20 percent slopes	7,895	1.4
EwF	Endsaw stony loam, 20 to 35 percent slopes	4,800	0.8
Ka	Kenn gravelly fine sandy loam, occasionally flooded	5,145	0.9
KC	Kenn-Ceda complex, frequently flooded	24,670	4.3
LMC	Linker-Mountainburg complex, 3 to 8 percent slopes	2,930	0.5
LvB	Leadvale silt loam, 1 to 3 percent slopes	17,950	3.1
LvC	Leadvale silt loam, 3 to 8 percent slopes	42,455	7.4
Na	Neff silt loam, occasionally flooded	4,855	0.8
NeC	Nella gravelly fine sandy loam, 3 to 8 percent slopes	1,655	0.3
NEE	Nella-Enders complex, 8 to 20 percent slopes	11,285	2.0
NEF	Nella-Enders complex, 20 to 40 percent slopes	25,670	4.5
OCG	Octavia-Carnasaw-Caston complex, 35 to 60 percent slopes	4,665	0.8
Rx	Rexor loam, frequently flooded	3,070	0.5
SaB	Sallisaw silt loam, 0 to 3 percent slopes	2,350	0.4
SaC	Sallisaw silt loam, 3 to 8 percent slopes	9,060	1.6
Sp	Spadra fine sandy loam, occasionally flooded	12,115	2.1
Ta	Taft silt loam, 0 to 2 percent slopes	8,820	1.5
Tf	Taft silt loam, mounded	5,610	1.0
Ud	Udorthents, 3 to 65 percent slopes, channery	205	*
WbC	Wilburton very cobbly loam, 1 to 8 percent slopes	1,680	0.3
	Large water	1,280	0.2
	Total	575,027	100.0

* Less than 0.1 percent.

TABLE 5.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability	Corn	Soybeans	Bahiagrass	Common bermudagrass	Improved bermudagrass	Tall fescue
		Bu	Bu	AUM*	AUM*	AUM*	AUM*
AvB---------- Avilla	IIe	75	25	---	7.0	8.5	7.0
AvC---------- Avilla	IIIe	70	20	---	7.0	8.5	7.0
CaC---------- Cane	IIIe	65	18	---	6.5	8.5	6.5
CbD---------- Carnasaw	VIs	---	---	---	4.0	---	4.0
CCF:							
Carnasaw-------	VIIs	---	---	---	---	---	---
Octavia--------	VIIs	---	---	---	---	---	---
CDC:							
Carnasaw-------	IVe	---	---	5.5	4.5	6.0	5.0
Sherless-------	IVe	---	---	---	5.0	6.0	5.0
CDE:							
Carnasaw-------	VIs	---	---	---	4.0	---	4.0
Sherless-------	VIs	---	---	---	4.0	---	4.0
CDF:							
Carnasaw-------	VIIs	---	---	---	---	---	---
Sherless-------	VIIs	---	---	---	---	---	---
CNC:							
Carnasaw-------	IVe	---	---	5.5	4.5	6.0	5.0
Sherless-------	IVe	---	---	---	5.0	6.0	5.0
Clebit---------	VIIs	---	---	---	---	---	---
CNE:							
Carnasaw-------	VIs	---	---	---	4.0	---	4.0
Sherless-------	VIs	---	---	---	4.0	---	4.0
Clebit---------	VIIs	---	---	---	---	---	---
CNF:							
Carnasaw-------	VIIs	---	---	---	---	---	---
Sherless-------	VIIs	---	---	---	---	---	---
Clebit---------	VIIs	---	---	---	---	---	---
Cr---------- Ceda	VIIw	---	---	---	---	---	---

See footnote at end of table.

TABLE 5.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Bahiagrass	Common bermudagrass	Improved bermudagrass	Tall fescue
		Bu	Bu	AUM*	AUM*	AUM*	AUM*
CSG:							
Clebit	VIIs	---	---	---	---	---	---
Sherless	VIIs	---	---	---	---	---	---
Carnasaw	VIIs	---	---	---	---	---	---
Cu Cupco	IIIw	85	25	---	6.5	7.5	6.0
EdC Enders	IVe	---	---	---	5.0	5.5	5.0
EdE Enders	VIe	---	---	---	4.0	---	4.0
EdF Enders	VIIs	---	---	---	---	---	---
EME:							
Enders	VIs	---	---	---	3.5	---	3.5
Mountainburg	VIIs	---	---	---	---	---	---
EMF, EMG:							
Enders	VIIs	---	---	---	---	---	---
Mountainburg	VIIs	---	---	---	---	---	---
EwC Endsaw	IVe	---	---	5.0	5.0	5.5	5.0
EwE Endsaw	VIs	---	---	---	3.5	---	3.5
EwF Endsaw	VIIs	---	---	---	---	---	---
Ka Kenn	IIw	75	20	5.5	6.0	7.0	6.0
KC:							
Kenn	Vw	---	---	---	6.0	7.0	5.5
Ceda	VIIw	---	---	---	---	---	---
LMC:							
Linker	IIIe	---	---	---	5.5	6.5	5.0
Mountainburg	VIs	---	---	4.5	3.5	4.5	4.0
LvB Leadvale	IIe	75	25	---	7.0	9.0	7.0
LvC Leadvale	IIIe	70	20	---	6.5	8.5	6.5
Na Neff	IIw	---	30	---	7.0	8.0	6.5

See footnote at end of table.

TABLE 5.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Bahiagrass	Common bermudagrass	Improved bermudagrass	Tall fescue
		Bu	Bu	AUM*	AUM*	AUM*	AUM*
NeC---------- Nella	IIIe	---	---	---	6.0	8.0	6.5
NEE:							
Nella----------	VIs	---	---	---	4.0	---	4.0
Enders---------	VIs	---	---	---	3.0	---	3.0
NEF:							
Nella----------	VIIs	---	---	---	---	---	---
Enders---------	VIIs	---	---	---	---	---	---
OCG:							
Octavia--------	VIIs	---	---	---	---	---	---
Carnasaw-------	VIIs	---	---	---	---	---	---
Caston---------	VIIs	---	---	---	---	---	---
Rx---------- Rexor	IVw	---	25	---	7.0	8.0	6.5
SaB---------- Sallisaw	IIe	75	25	---	6.0	7.5	6.0
SaC---------- Sallisaw	IIIe	---	---	---	5.5	7.0	5.5
Sp---------- Spadra	IIw	85	30	---	8.0	9.0	7.5
Ta, Tf---------- Taft	IIIw	80	25	---	6.0	7.5	6.5
Ud---------- Udorthents	VIIe	---	---	---	---	---	---
WbC---------- Wilburton	IVs	---	---	4.0	4.0	---	3.5

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Woodland suitability group	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	Productivity class*	
AvB, AvC-------- Avilla	8A7	Slight	Slight	Slight	Slight	Shortleaf pine------ Southern red oak---- Loblolly pine------- Cherrybark oak------ Sweetgum------------ Black walnut--------	70 65 70 --- 70 ---	8 --- --- --- --- ---	Shortleaf pine, loblolly pine, black walnut, cherrybark oak.
CaC-------------- Cane	8D8	Slight	Slight	Slight	Moderate	Shortleaf pine------ Sweetgum------------ Loblolly pine-------	70 80 80	8 --- ---	Loblolly pine, shortleaf pine.
CbD-------------- Carnasaw	7X8	Slight	Moderate	Slight	Slight	Shortleaf pine------ Loblolly pine------- Southern red oak----	65 70 ---	7 --- ---	Loblolly pine, shortleaf pine.
CCF**: Carnasaw-------	7R8	Moderate	Moderate	Slight	Slight	Shortleaf pine------ Loblolly pine------- Southern red oak----	65 70 ---	7 --- ---	Loblolly pine, shortleaf pine.
Octavia---------	7R8	Moderate	Moderate	Slight	Slight	Shortleaf pine------ Southern red oak---- Hickory------------- White oak-----------	65 60 --- ---	7 --- --- ---	Loblolly pine, shortleaf pine.
CDC**: Carnasaw-------	7A7	Slight	Slight	Slight	Slight	Shortleaf pine------ Loblolly pine-------	65 70	7 ---	
Sherless--------	7A7	Slight	Slight	Slight	Slight	Shortleaf pine------ White oak----------- Southern red oak---- Sweetgum------------ Blackgum------------- Hickory-------------	65 --- --- --- --- ---	8 --- --- --- --- ---	Loblolly pine, shortleaf pine.
CDE**: Carnasaw-------	7A7	Slight	Slight	Slight	Slight	Shortleaf pine------ Loblolly pine-------	65 70	7 ---	Loblolly pine, shortleaf pine.
Sherless--------	7A7	Slight	Slight	Slight	Slight	Shortleaf pine------ White oak----------- Southern red oak---- Sweetgum------------ Blackgum------------- Hickory-------------	65 --- --- --- --- ---	7 --- --- --- --- ---	Loblolly pine, shortleaf pine.
CDF**: Carnasaw-------	7R8	Moderate	Moderate	Slight	Slight	Shortleaf pine------ Loblolly pine------- Southern red oak----	65 70 ---	7 --- ---	Loblolly pine, shortleaf pine.

See footnote at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Woodland suitability group	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	Productivity class*	
CDF**:									
Sherless	7R8	Moderate	Moderate	Slight	Slight	Shortleaf pine	65	7	Loblolly pine, shortleaf pine.
						White oak	---	---	
						Southern red oak	---	---	
						Hickory	---	---	
CNC**:									
Carnasaw	7A7	Slight	Slight	Slight	Slight	Shortleaf pine	65	7	
						Loblolly pine	70	---	
Sherless	7A7	Slight	Slight	Slight	Slight	Shortleaf pine	65	7	Loblolly pine, shortleaf pine.
						White oak	---	---	
						Southern red oak	---	---	
						Sweetgum	---	---	
						Blackgum	---	---	
						Hickory	---	---	
Clebit	3D9	Slight	Moderate	Moderate	Severe	Shortleaf pine	40	3	Loblolly pine, shortleaf pine.
						Eastern redcedar	---	---	
						Post oak	---	---	
CNE**:									
Carnasaw	7A7	Slight	Slight	Slight	Slight	Shortleaf pine	65	7	Loblolly pine, shortleaf pine.
						Loblolly pine	70	---	
Sherless	7A7	Slight	Slight	Slight	Slight	Shortleaf pine	65	7	Loblolly pine, shortleaf pine.
						White oak	---	---	
						Southern red oak	---	---	
						Sweetgum	---	---	
						Blackgum	---	---	
						Hickory	---	---	
Clebit	3D9	Slight	Moderate	Moderate	Severe	Shortleaf pine	40	3	Loblolly pine, shortleaf pine.
						Eastern redcedar	---	---	
						Post oak	---	---	
CNF**:									
Carnasaw	6R8	Moderate	Moderate	Slight	Slight	Shortleaf pine	60	6	Loblolly pine, shortleaf pine.
						Loblolly pine	70	---	
						Southern red oak	---	---	
Sherless	6R8	Moderate	Moderate	Slight	Slight	Shortleaf pine	60	6	Loblolly pine, shortleaf pine.
						White oak	---	---	
						Southern red oak	---	---	
						Hickory	---	---	
Clebit	3D9	Moderate	Moderate	Moderate	Severe	Shortleaf pine	40	3	Loblolly pine, shortleaf pine.
						Eastern redcedar	---	---	
						Post oak	---	---	
Cr Ceda	7W9	Slight	Slight	Severe	Slight	Shortleaf pine	65	7	Loblolly pine, shortleaf pine, American sycamore, sweetgum.
						Southern red oak	---	---	
						White oak	---	---	
						Sweetgum	80	---	
						American sycamore	80	---	

See footnote at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Woodland suitability group	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	Productivity class*	
CSG**:									
Clebit	3R9	Moderate	Severe	Moderate	Severe	Shortleaf pine	40	3	Loblolly pine, shortleaf pine.
						Eastern redcedar	---	---	
						Post oak	---	---	
Sherless	6R9	Severe	Severe	Slight	Slight	Shortleaf pine	60	6	Loblolly pine, shortleaf pine.
						White oak	---	---	
						Southern red oak	---	---	
						Hickory	---	---	
Carnasaw	6R9	Severe	Severe	Moderate	Slight	Shortleaf pine	60	6	Shortleaf pine, loblolly pine.
						Hickory	---	---	
						White oak	---	---	
						Blackjack oak	---	---	
						Post oak	---	---	
Cu	9W9	Slight	Moderate	Moderate	Severe	Shortleaf pine	80	9	Shortleaf pine, loblolly pine.
Cupco						Water oak	80	---	
						Green ash	---	---	
						Willow oak	---	---	
EdC, EdE	6C8	Slight	Moderate	Slight	Slight	Shortleaf pine	60	6	Shortleaf pine, eastern redcedar, loblolly pine.
Enders						Southern red oak	60	---	
						White oak	55	---	
						Eastern redcedar	40	---	
EdF	6R8	Moderate	Moderate	Slight	Slight	Shortleaf pine	60	6	Shortleaf pine, eastern redcedar, loblolly pine.
Enders						Eastern redcedar	40	---	
						Southern red oak	60	---	
						White oak	55	---	
EME**:									
Enders	6X8	Slight	Moderate	Slight	Slight	Shortleaf pine	60	6	Shortleaf pine, eastern redcedar, loblolly pine.
						Eastern redcedar	40	---	
						Southern red oak	60	---	
						White oak	55	---	
Mountainburg	5D3	Slight	Moderate	Moderate	Severe	Shortleaf pine	55	5	Shortleaf pine, eastern redcedar, loblolly pine.
						Eastern redcedar	35	---	
						Post oak	---	---	
EMF**:									
Enders	6R8	Moderate	Moderate	Slight	Slight	Shortleaf pine	60	6	Shortleaf pine, eastern redcedar, loblolly pine.
						Eastern redcedar	40	---	
						Southern red oak	60	---	
						White oak	55	---	
Mountainburg	5D3	Moderate	Moderate	Moderate	Severe	Shortleaf pine	55	5	Shortleaf pine, eastern redcedar, loblolly pine.
						Eastern redcedar	35	---	
						Post oak	---	---	

See footnote at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Woodland suitability group	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	Productivity class*	
EMG**:									
Enders	6R9	Severe	Severe	Slight	Slight	Shortleaf pine	60	6	Shortleaf pine, eastern redcedar, loblolly pine.
						Eastern redcedar	40	---	
						Southern red oak	60	---	
						White oak	55	---	
Mountainburg	5R3	Moderate	Severe	Moderate	Severe	Shortleaf pine	55	5	Shortleaf pine, eastern redcedar, loblolly pine.
						Eastern redcedar	35	---	
						Post oak	---	---	
EwC Endsaw	6C8	Slight	Moderate	Slight	Slight	Shortleaf pine	60	6	Shortleaf pine, loblolly pine.
						Post oak	50	---	
						Blackjack oak	---	---	
EwE Endsaw	6C8	Moderate	Moderate	Slight	Slight	Shortleaf pine	60	6	
						Post oak	50	---	
						Blackjack oak	50	---	
EwF Endsaw	6R8	Moderate	Moderate	Slight	Slight	Shortleaf pine	60	6	
						Post oak	50	---	
						Blackjack oak	50	---	
Ka Kenn	8A7	Slight	Slight	Slight	Slight	Shortleaf pine	70	8	Shortleaf pine, loblolly pine.
						Southern red oak	70	---	
						Sweetgum	80	---	
						Post oak	---	---	
KC**:									
Kenn	8W9	Slight	Slight	Severe	Slight	Shortleaf pine	70	8	Shortleaf pine, loblolly pine.
						Southern red oak	70	---	
						Sweetgum	80	---	
						Post oak	---	---	
Ceda	7W9	Slight	Slight	Severe	Slight	Shortleaf pine	65	7	Loblolly pine, shortleaf pine, American sycamore, sweetgum.
						Southern red oak	---	---	
						White oak	---	---	
						Sweetgum	80	---	
						American sycamore	80	---	
LvB Leadvale	8D8	Slight	Slight	Slight	Moderate	Shortleaf pine	70	8	Loblolly pine, shortleaf pine.
						White oak	70	---	
						Loblolly pine	80	---	
LvC Leadvale	8D8	Slight	Slight	Slight	Moderate	Shortleaf pine	70	8	Loblolly pine, shortleaf pine.
						White oak	70	---	
						Loblolly pine	80	---	
LMC**:									
Linker	6D8	Slight	Slight	Slight	Moderate	Shortleaf pine	60	6	Shortleaf pine, loblolly pine, eastern redcedar.
						Southern red oak	50	---	
						White oak	50	---	
						Eastern redcedar	40	---	
Mountainburg	5D3	Slight	Moderate	Moderate	Severe	Shortleaf pine	55	5	Shortleaf pine, eastern redcedar, loblolly pine.
						Eastern redcedar	35	---	
						Post oak	---	---	

See footnote at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Woodland suitability group	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	Productivity class*	
Na Neff	9W8	Slight	Moderate	Moderate	Moderate	Shortleaf pine Water oak Sweetgum Willow oak Green ash	80 80 80 80 ---	9 --- --- --- ---	Eastern cottonwood, loblolly pine, sweetgum, green ash, shortleaf pine.
NeC Nella	8A7	Slight	Slight	Slight	Slight	Shortleaf pine Southern red oak	70 70	8 ---	Loblolly pine, shortleaf pine.
NEE**:									
Nella	8A7	Slight	Slight	Slight	Slight	Shortleaf pine Southern red oak	70 70	8 ---	Loblolly pine, shortleaf pine.
Enders	6C8	Slight	Moderate	Slight	Slight	Shortleaf pine Eastern redcedar Southern red oak White oak	60 40 60 56	6 --- --- ---	Shortleaf pine, loblolly pine.
NEF**:									
Nella	8R8	Moderate	Moderate	Slight	Slight	Shortleaf pine Southern red oak	70 70	8 ---	Loblolly pine, shortleaf pine.
Enders	6R8	Moderate	Moderate	Slight	Slight	Shortleaf pine Eastern redcedar Southern red oak White oak	60 40 60 55	6 --- --- ---	Shortleaf pine, eastern redcedar, loblolly pine.
OCG**:									
Octavia	6R9	Severe	Severe	Moderate	Slight	Shortleaf pine Southern red oak Hickory White oak	60 60 --- ---	6 --- --- ---	Shortleaf pine, loblolly pine.
Carnasaw	6R9	Severe	Severe	Moderate	Slight	Shortleaf pine Hickory White oak Blackjack oak Post oak	60 --- --- --- ---	6 --- --- --- ---	Shortleaf pine, loblolly pine.
Caston	6R9	Severe	Severe	Moderate	Slight	Shortleaf pine Southern red oak White oak Hickory	60 60 --- ---	6 --- --- ---	Shortleaf pine, loblolly pine.
Rx Rexor	9W9	Slight	Slight	Severe	Slight	Shortleaf pine Loblolly pine Sweetgum White oak Southern red oak Black walnut	80 90 --- --- --- ---	9 --- --- --- --- ---	Shortleaf pine, loblolly pine, black walnut.

See footnote at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Woodland suitability group	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	Productivity class*	
SaB, SaC-------- Sallisaw	7A7	Slight	Slight	Slight	Slight	Shortleaf pine------ Southern red oak---- Hackberry---------- Green ash----------	66 --- --- ---	7 --- --- ---	Shortleaf pine, loblolly pine, black walnut, cherrybark oak.
Sp-------------- Spadra	10A7	Slight	Slight	Slight	Slight	Shortleaf pine------ Southern red oak----	85 80	10 ---	Loblolly pine, shortleaf pine, southern red oak, black walnut.
Ta, Tf---------- Taft	6W8	Slight	Moderate	Moderate	Moderate	Shortleaf pine------ White oak---------- Loblolly pine------- Sweetgum----------	60 60 85 80	6 --- --- ---	Loblolly pine, shortleaf pine.
WbC------------- Wilburton	6F8	Slight	Slight	Moderate	Slight	Shortleaf pine------ Hickory---------- Post oak---------- Blackjack oak------- White oak----------	60 --- --- --- ---	6 --- --- --- ---	Shortleaf pine, loblolly pine.

* Productivity class is the yield in cubic meters per hectare per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
AvB, AvC Avilla	Slight	Slight	Moderate: slope, small stones.	Slight.
CaC Cane	Moderate: wetness.	Moderate: wetness.	Moderate: slope, small stones, wetness.	Slight.
CbD Carnasaw	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight.
CCF*: Carnasaw	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Octavia	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
CDC*: Carnasaw	Moderate: small stones, percs slowly.	Moderate: small stones, percs slowly.	Severe: small stones.	Slight.
Sherless	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight.
CDE*: Carnasaw	Moderate: slope, large stones, percs slowly.	Moderate: slope, large stones, percs slowly.	Severe: large stones, slope.	Moderate: large stones.
Sherless	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: large stones, slope.	Moderate: large stones.
CDF*: Carnasaw	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Sherless	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
CNC*: Carnasaw	Moderate: small stones, percs slowly.	Moderate: small stones, percs slowly.	Severe: small stones.	Slight.
Sherless	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight.

See footnote at end of table.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
CNC*:				
Clebit	Severe: depth to rock.	Severe: depth to rock.	Severe: large stones, small stones.	Severe: large stones.
CNE*:				
Carnasaw	Moderate: slope, large stones, percs slowly.	Moderate: slope, large stones, percs slowly.	Severe: large stones, slope.	Moderate: large stones.
Sherless	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: large stones, slope, small stones.	Moderate: large stones.
Clebit	Severe: depth to rock.	Severe: depth to rock.	Severe: large stones, slope, small stones.	Severe: large stones.
CNF*:				
Carnasaw	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Sherless	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Clebit	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, small stones.	Severe: large stones, slope.
Cr Ceda	Severe: flooding, large stones.	Severe: large stones.	Severe: large stones, small stones, flooding.	Moderate: large stones, flooding.
CSG*:				
Clebit	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, small stones.	Severe: large stones, slope.
Sherless	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Carnasaw	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Severe: slope.
Cu Cupco	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
EdC Enders	Severe: percs slowly.	Severe: percs slowly.	Severe: small stones, percs slowly.	Slight.

See footnote at end of table.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
EdE--- Enders	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Moderate: slope.
EdF--- Enders	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: slope.
EME*:				
Enders---	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Moderate: large stones.
Mountainburg---	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Moderate: large stones.
EMF*, EMG*:				
Enders---	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: slope.
Mountainburg---	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.
EwC--- Endsaw	Moderate: small stones, percs slowly.	Moderate: percs slowly, small stones.	Severe: small stones.	Slight.
EwE--- Endsaw	Moderate: slope, large stones, percs slowly.	Moderate: slope, large stones, percs slowly.	Severe: slope, small stones.	Moderate: slope.
EwF--- Endsaw	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
Ka--- Kenn	Severe: flooding.	Moderate: small stones.	Severe: small stones.	Slight.
KC*:				
Kenn---	Severe: flooding.	Moderate: flooding, small stones.	Severe: small stones, flooding.	Moderate: flooding.
Ceda---	Severe: flooding, large stones.	Severe: large stones.	Severe: large stones, small stones, flooding.	Moderate: large stones, flooding.
LMC*:				
Linker---	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight.
Mountainburg---	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Slight.

See footnote at end of table.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
LvB, LvC---------- Leadvale	Moderate: wetness.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Slight.
Na---------- Neff	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.
NeC---------- Nella	Slight----------	Slight----------	Severe: small stones.	Slight.
NEE*:				
Nella----------	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: slope, large stones.	Moderate: slope.
Enders----------	Severe: percs slowly.	Severe: percs slowly.	Severe: large stones, slope, percs slowly.	Moderate: large stones.
NEF*:				
Nella----------	Severe: slope.	Severe: slope.	Severe: slope, large stones.	Severe: slope.
Enders----------	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: slope, percs slowly, large stones.	Moderate: large stones.
OCG*:				
Octavia----------	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.
Carnasaw----------	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Severe: slope.
Caston----------	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.
Rx---------- Rexor	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Slight.
SaB---------- Sallisaw	Slight----------	Slight----------	Moderate: slope, small stones.	Slight.
SaC---------- Sallisaw	Slight----------	Slight----------	Moderate: slope, small stones.	Slight.
Sp---------- Spadra	Severe: flooding.	Slight----------	Moderate: small stones, flooding.	Slight.

See footnote at end of table.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
Ta, Tf---------- Taft	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.
Ud---------- Udorthents	---	---	---	---
WbC---------- Wilburton	Severe: large stones.	Severe: large stones.	Severe: large stones.	Severe: large stones.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
AvB, AvC---------- Avilla	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CaC---------- Cane	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Fair	Very poor.
CbD---------- Carnasaw	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
CCF*:										
Carnasaw----------	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Octavia----------	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
CDC*:										
Carnasaw----------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Sherless----------	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
CDE*:										
Carnasaw----------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Sherless----------	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
CDF*:										
Carnasaw----------	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Sherless----------	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
CNC*:										
Carnasaw----------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Sherless----------	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
Clebit----------	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
CNE*:										
Carnasaw----------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Sherless----------	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.

See footnote at end of table.

TABLE 8.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
CNE*:										
Clebit	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
CNF*:										
Carnasaw	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Sherless	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Clebit	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
Cr Ceda	Poor	Fair	Fair	Fair	Fair	Poor	Very poor.	Fair	Fair	Very poor.
CSG*:										
Clebit	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
Sherless	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Carnasaw	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Cu Cupco	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
EdC, EdE Enders	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
EdF Enders	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
EME*:										
Enders	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Mountainburg	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Poor	Very poor.
EMF*:										
Enders	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Mountainburg	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Poor	Very poor.
EMG*:										
Enders	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Very poor.	Good	Very poor.
Mountainburg	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Poor	Very poor.
EwC Endsaw	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

See footnote at end of table.

TABLE 8.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
EwE---- Endsaw	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
EwF---- Endsaw	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Ka---- Kenn	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
KC*:										
Kenn----	Poor	Fair	Fair	Fair	Fair	Poor	Very poor.	Fair	Fair	Very poor.
Ceda----	Poor	Fair	Fair	Fair	Fair	Poor	Very poor.	Fair	Fair	Very poor.
LMC*:										
Linker----	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
Mountainburg----	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Poor	Very poor.
LvB---- Leadvale	Fair	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
LvC---- Leadvale	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Na---- Neff	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
NeC---- Nella	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
NEE*:										
Nella----	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Enders----	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
NEF*:										
Nella----	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Enders----	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
OCG*:										
Octavia----	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Carnasaw----	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Caston----	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.

See footnote at end of table.

TABLE 8.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
Rx---------- Rexor	Poor	Fair	Fair	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
SaB---------- Sallisaw	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
SaC---------- Sallisaw	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Sp---------- Spadra	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Ta, Tf---------- Taft	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Ud---------- Udorthents	---	---	---	---	---	---	---	---	---	---
WbC---------- Wilburton	Poor	Poor	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets
AvB Avilla	Slight	Slight	Slight	Slight.
AvC Avilla	Slight	Slight	Moderate: slope.	Slight.
CaC Cane	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, slope.	Moderate: wetness.
CbD Carnasaw	Moderate: too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength.
CCF*: Carnasaw	Severe: slope.	Severe: shrink-swell, slope.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength, slope.
Octavia	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
CDC*: Carnasaw	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.
Sherless	Moderate: depth to rock.	Slight	Moderate: slope.	Slight.
CDE*: Carnasaw	Moderate: too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength.
Sherless	Moderate: depth to rock, slope.	Moderate: slope.	Severe: slope.	Moderate: slope.
CDF*: Carnasaw	Severe: slope.	Severe: shrink-swell, slope.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength, slope.
Sherless	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets
CNC*:				
Carnasaw	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.
Sherless	Moderate: depth to rock.	Slight	Moderate: slope.	Slight.
Clebit	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.
CNE*:				
Carnasaw	Moderate: too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength.
Sherless	Moderate: depth to rock, slope.	Moderate: slope.	Severe: slope.	Moderate: slope.
Clebit	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.
CNF*:				
Carnasaw	Severe: slope.	Severe: shrink-swell, slope.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength, slope.
Sherless	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Clebit	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
Cr Ceda	Moderate: large stones, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
CSG*:				
Clebit	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
Sherless	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Carnasaw	Severe: slope.	Severe: shrink-swell, slope.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength, slope.
Cu Cupco	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets
EdC---------- Enders	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.
EdE---------- Enders	Moderate: too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength.
EdF---------- Enders	Severe: slope.	Severe: shrink-swell, slope.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength, slope.
EME*:				
Enders----------	Moderate: too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength.
Mountainburg-----	Severe: depth to rock, large stones.	Severe: depth to rock, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, large stones.
EMF*, EMG*:				
Enders----------	Severe: slope.	Severe: shrink-swell, slope.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength, slope.
Mountainburg-----	Severe: depth to rock, large stones, slope.	Severe: slope, depth to rock, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.
EwC---------- Endsaw	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.
EwE---------- Endsaw	Moderate: too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength.
EwF---------- Endsaw	Severe: wetness, slope.	Severe: shrink-swell, slope.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength, slope.
Ka---------- Kenn	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
KC*:				
Kenn----------	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
Ceda----------	Moderate: large stones, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets
LMC*:				
Linker	Severe: depth to rock.	Moderate: depth to rock.	Moderate: slope, depth to rock.	Moderate: depth to rock.
Mountainburg	Severe: depth to rock, large stones.	Severe: depth to rock, large stones.	Severe: depth to rock, large stones.	Severe: depth to rock, large stones.
LvB	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: low strength, wetness.
Leadvale				
LvC	Severe: wetness.	Moderate: wetness.	Moderate: wetness, slope.	Moderate: low strength, wetness.
Leadvale				
Na	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.
Neff				
NeC	Slight	Slight	Moderate: slope.	Slight.
Nella				
NEE*:				
Nella	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.
Enders	Moderate: too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength.
NEF*:				
Nella	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Enders	Severe: slope.	Severe: shrink-swell, slope.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength, slope.
OCG*:				
Octavia	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Carnasaw	Severe: slope.	Severe: shrink-swell, slope.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength, slope.
Caston	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rx	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding.
Rexor				
SaB	Slight	Slight	Slight	Slight.
Sallisaw				

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets
SaC---------- Sallisaw	Slight----------	Slight----------	Moderate: slope.	Slight.
Sp---------- Spadra	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
Ta, Tf---------- Taft	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, low strength.
Ud---------- Udorthents	---	---	---	---
WbC---------- Wilburton	Severe: large stones.	Severe: large stones.	Severe: large stones.	Severe: large stones.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
AvB, AvC Avilla	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Poor: small stones.
CaC Cane	Severe: wetness, percs slowly.	Moderate: slope.	Moderate: wetness, too clayey.	Moderate: wetness.	Fair: too clayey, wetness.
CbD Carnasaw	Severe: percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock, slope.	Poor: too clayey, hard to pack.
CCF*: Carnasaw	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
Octavia	Severe: percs slowly, slope.	Severe: slope, large stones.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
CDC*: Carnasaw	Severe: percs slowly.	Moderate: depth to rock, slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock.	Poor: too clayey, hard to pack.
Sherless	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
CDE*: Carnasaw	Severe: percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock, slope.	Poor: too clayey, hard to pack.
Sherless	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
CDF*: Carnasaw	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
Sherless	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
CNC*: Carnasaw	Severe: percs slowly.	Moderate: depth to rock, slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock.	Poor: too clayey, hard to pack.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
CNC*:					
Sherless	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
Clebit	Severe: depth to rock.	Severe: depth to rock, large stones.	Severe: depth to rock, seepage.	Severe: depth to rock.	Poor: depth to rock, small stones.
CNE*:					
Carnasaw	Severe: percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock, slope.	Poor: too clayey, hard to pack.
Sherless	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
Clebit	Severe: depth to rock.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, seepage.	Severe: depth to rock.	Poor: depth to rock, small stones.
CNF*:					
Carnasaw	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
Sherless	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
Clebit	Severe: depth to rock, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, slope.	Poor: depth to rock, small stones, slope.
Cr Ceda	Severe: flooding, poor filter.	Severe: seepage, flooding.	Severe: flooding, seepage.	Severe: flooding, seepage.	Poor: seepage, small stones.
CSG*:					
Clebit	Severe: depth to rock, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, slope.	Poor: depth to rock, small stones, slope.
Sherless	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
Carnasaw	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
Cu Cupco	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
EdC---------- Enders	Severe: percs slowly.	Moderate: depth to rock, slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock.	Poor: too clayey, hard to pack.
EdE---------- Enders	Severe: percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock, slope.	Poor: too clayey, hard to pack.
EdF---------- Enders	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
EME*: Enders----------	Severe: percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock, slope.	Poor: too clayey, hard to pack,
Mountainburg-------	Severe: depth to rock, large stones.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock.	Poor: depth to rock, large stones.
EMF*, EMG*: Enders----------	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
Mountainburg-------	Severe: depth to rock, slope, large stones.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, slope.	Poor: depth to rock, large stones, slope.
EwC---------- Endsaw	Severe: percs slowly.	Moderate: depth to rock, slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock.	Poor: too clayey, hard to pack.
EwE---------- Endsaw	Severe: percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock, slope.	Poor: too clayey, hard to pack.
EwF---------- Endsaw	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
Ka---------- Kenn	Severe: flooding.	Severe: flooding.	Severe: flooding, seepage.	Severe: flooding.	Poor: small stones.
KC*: Kenn----------	Severe: flooding.	Severe: flooding.	Severe: flooding, seepage.	Severe: flooding.	Poor: seepage, small stones.
Ceda----------	Severe: flooding, poor filter.	Severe: seepage, flooding.	Severe: flooding, seepage.	Severe: flooding, seepage.	Poor: small stones.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
LMC*:					
Linker	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock, small stones.
Mountainburg	Severe: depth to rock, large stones.	Severe: seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: depth to rock.	Poor: depth to rock, large stones.
LvB, LvC Leadvale	Severe: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness, too clayey.	Moderate: wetness.	Fair: too clayey.
Na Neff	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
NeC Nella	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey, large stones.	Slight	Poor: small stones.
NEE*:					
Nella	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey, large stones.	Moderate: slope.	Poor: small stones.
Enders	Severe: percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock, slope.	Poor: too clayey, hard to pack, small stones.
NEF*:					
Nella	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
Enders	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
OCG*:					
Octavia	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
Carnasaw	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
Caston	Severe: slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope.	Poor: small stones, slope.
Rx Rexor	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.	Fair: too clayey, wetness.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
SaB---------- Sallisaw	Moderate: percs slowly.	Moderate: seepage.	Moderate: too clayey.	Slight----------	Fair: small stones.
SaC---------- Sallisaw	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight----------	Fair: small stones.
Sp---------- Spadra	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Fair: too clayey, small stones.
Ta, Tf---------- Taft	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Ud---------- Udorthents	---	---	---	---	---
WbC---------- Wilburton	Severe: large stones.	Severe: large stones.	Severe: large stones.	Slight----------	Poor: small stones.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
AvB, AvC Avilla	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
CaC Cane	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, thin layer.
CbD Carnasaw	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, area reclaim.
CCF*: Carnasaw	Poor: shrink-swell, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, area reclaim.
Octavia	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
CDC*, CDE*: Carnasaw	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, area reclaim.
Sherless	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
CDF*: Carnasaw	Poor: shrink-swell, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, area reclaim.
Sherless	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, slope.
CNC*, CNE*: Carnasaw	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, area reclaim.
Sherless	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
CNC*, CNE*:				
Clebit	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones.
CNF*:				
Carnasaw	Poor: shrink-swell, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, area reclaim.
Sherless	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, slope.
Clebit	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
Cr Ceda	Fair: large stones.	Improbable: small stones.	Probable	Poor: small stones, area reclaim.
CSG*:				
Clebit	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
Sherless	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, slope.
Carnasaw	Poor: shrink-swell, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, area reclaim.
Cu Cupco	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, thin layer.
EdC, EdE Enders	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, area reclaim.
EdF Enders	Poor: shrink-swell, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, area reclaim.
EME*:				
Enders	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, area reclaim.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
EME*:				
Mountainburg	Poor: depth to rock, large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: depth to rock, large stones.
EMF*, EMG*:				
Enders	Poor: shrink-swell, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, area reclaim.
Mountainburg	Poor: depth to rock, large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: depth to rock, large stones, slope.
EwC Endsaw	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones.
EwE Endsaw	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
EwF Endsaw	Poor: shrink-swell, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Ka Kenn	Fair: shrink-swell, large stones.	Improbable: small stones.	Probable	Poor: small stones, large stones, area reclaim.
KC*:				
Kenn	Fair: shrink-swell, large stones.	Improbable: small stones.	Probable	Poor: small stones, large stones, area reclaim.
Ceda	Fair: large stones.	Improbable: small stones.	Probable: excess fines.	Poor: small stones, area reclaim.
LMC*:				
Linker	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Mountainburg	Poor: depth to rock, large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: depth to rock, large stones.
LvB, LvC Leadvale	Fair: low strength, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Good.
Na Neff	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, thin layer.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
NeC---------- Nella	Good----------	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
NEE*: Nella----------	Good----------	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Enders----------	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, area reclaim.
NEF*: Nella----------	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Enders----------	Poor: shrink-swell, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, area reclaim.
OCG*: Octavia----------	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Carnasaw----------	Poor: shrink-swell, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, area reclaim.
Caston----------	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Rx---------- Rexor	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
SaB, SaC---------- Sallisaw	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Sp---------- Spadra	Good----------	Poor: small stones.	Improbable: excess fines.	Poor: small stones.
Ta, Tf---------- Taft	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
Ud---------- Udorthents	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
WbC---------- Wilburton	Poor: large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, area reclaim.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
AvB---------- Avilla	Moderate: seepage.	Moderate: piping.	Deep to water	Favorable------	Favorable------	Favorable.
AvC---------- Avilla	Moderate: seepage, slope.	Moderate: piping.	Deep to water	Slope----------	Favorable------	Favorable.
CaC---------- Cane	Moderate: slope.	Severe: piping.	Percs slowly, slope.	Wetness, percs slowly, rooting depth.	Erodes easily, wetness, rooting depth.	Erodes easily, rooting depth.
CbD---------- Carnasaw	Severe: slope.	Moderate: thin layer, hard to pack.	Deep to water	Slope, droughty, percs slowly.	Slope, erodes easily, percs slowly.	Slope, erodes easily, droughty.
CCF*:						
Carnasaw---------	Severe: slope.	Moderate: thin layer, hard to pack.	Deep to water	Slope, droughty, percs slowly.	Slope, erodes easily, percs slowly.	Slope, erodes easily, droughty.
Octavia----------	Severe: slope.	Moderate: piping, large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.	Large stones, slope, droughty.
CDC*:						
Carnasaw---------	Moderate: depth to rock, slope.	Moderate: thin layer, hard to pack.	Deep to water	Percs slowly, slope.	Percs slowly---	Percs slowly.
Sherless---------	Moderate: seepage, depth to rock, slope.	Moderate: thin layer, piping.	Deep to water	Depth to rock, slope.	Large stones, depth to rock.	Large stones, depth to rock.
CDE*:						
Carnasaw---------	Severe: slope.	Moderate: thin layer, hard to pack.	Deep to water	Slope, droughty, percs slowly.	Slope, percs slowly.	Slope, droughty, percs slowly.
Sherless---------	Severe: slope.	Moderate: thin layer, piping.	Deep to water	Depth to rock, slope.	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
CDF*:						
Carnasaw---------	Severe: slope.	Moderate: thin layer, hard to pack.	Deep to water	Slope, droughty, percs slowly.	Slope, erodes easily, percs slowly.	Slope, erodes easily, droughty.
Sherless---------	Severe: slope.	Severe: thin layer.	Deep to water	Slope, depth to rock.	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
CNC*:						
Carnasaw	Moderate: depth to rock, slope.	Moderate: thin layer, hard to pack.	Deep to water	Percs slowly, slope.	Percs slowly	Percs slowly.
Sherless	Moderate: seepage, depth to rock, slope.	Moderate: thin layer, piping.	Deep to water	Depth to rock, slope.	Large stones, depth to rock.	Large stones, depth to rock.
Clebit	Severe: depth to rock.	Severe: seepage, large stones.	Deep to water	Slope, large stones, droughty.	Large stones, depth to rock.	Large stones, droughty.
CNE*:						
Carnasaw	Severe: slope.	Moderate: thin layer, hard to pack.	Deep to water	Slope, droughty, percs slowly.	Slope, percs slowly.	Slope, droughty, percs slowly.
Sherless	Severe: slope.	Moderate: thin layer, piping.	Deep to water	Depth to rock, slope.	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
Clebit	Severe: depth to rock, slope.	Severe: seepage, large stones.	Deep to water	Slope, large stones, droughty.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
CNF*:						
Carnasaw	Severe: slope.	Moderate: thin layer, hard to pack.	Deep to water	Slope, droughty, percs slowly.	Slope, erodes easily, percs slowly.	Slope, erodes easily, droughty.
Sherless	Severe: slope.	Severe: thin layer.	Deep to water	Slope, depth to rock.	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
Clebit	Severe: depth to rock, slope.	Severe: seepage, large stones.	Deep to water	Slope, large stones, droughty.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
Cr Ceda	Severe: seepage.	Severe: seepage.	Deep to water	Large stones, droughty, flooding.	Large stones	Large stones, droughty.
CSG*:						
Clebit	Severe: depth to rock, slope.	Severe: seepage, large stones.	Deep to water	Slope, large stones, droughty.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
Sherless	Severe: slope.	Severe: thin layer.	Deep to water	Slope, depth to rock.	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
Carnasaw	Severe: slope.	Moderate: thin layer, hard to pack.	Deep to water	Slope, droughty, percs slowly.	Slope, percs slowly.	Slope, droughty, percs slowly.
Cu Cupco	Slight	Severe: wetness.	Flooding	Wetness, flooding.	Wetness	Wetness.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
EdC---------- Enders	Moderate: depth to rock, slope.	Moderate: thin layer, hard to pack.	Deep to water	Slope, percs slowly.	Percs slowly---	Percs slowly.
EdE, EdF---------- Enders	Severe: slope.	Moderate: thin layer, hard to pack.	Deep to water	Slope, percs slowly.	Slope, percs slowly.	Slope, percs slowly.
EME*, EMF*, EMG*: Enders----------	Severe: slope.	Moderate: thin layer, hard to pack.	Deep to water	Slope, percs slowly.	Slope, percs slowly.	Slope, percs slowly.
Mountainburg-----	Severe: depth to rock, slope.	Severe: large stones.	Deep to water	Slope, large stones, droughty.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
EwC---------- Endsaw	Moderate: depth to rock, slope.	Moderate: thin layer, hard to pack.	Deep to water	Slope, droughty, percs slowly.	Depth to rock, percs slowly.	Droughty, depth to rock.
EwE, EwF---------- Endsaw	Severe: slope.	Moderate: thin layer, hard to pack, large stones.	Deep to water	Droughty, percs slowly, slope.	Slope, large stones, erodes easily.	Large stones, slope, erodes easily.
Ka---------- Kenn	Moderate: seepage.	Moderate: piping, large stones.	Deep to water	Droughty, flooding.	Large stones---	Large stones, droughty.
KC*: Kenn----------	Moderate: seepage.	Moderate: piping, large stones.	Deep to water	Droughty, flooding.	Large stones---	Large stones, droughty.
Ceda----------	Severe: seepage.	Severe: seepage.	Deep to water	Large stones, droughty, flooding.	Large stones---	Large stones, droughty.
LMC*: Linker----------	Moderate: seepage, depth to rock, slope.	Severe: piping.	Deep to water	Slope, droughty, soil blowing.	Depth to rock, soil blowing.	Droughty, depth to rock.
Mountainburg-----	Severe: depth to rock.	Severe: large stones.	Deep to water	Slope, large stones, droughty.	Large stones, depth to rock.	Large stones, droughty.
LvB---------- Leadvale	Moderate: seepage, depth to rock.	Severe: piping.	Percs slowly---	Wetness, percs slowly.	Erodes easily, wetness.	Erodes easily, rooting depth.
LvC---------- Leadvale	Moderate: seepage, depth to rock, slope.	Severe: piping.	Percs slowly, slope.	Slope, wetness, percs slowly.	Erodes easily, wetness.	Erodes easily, rooting depth.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
Na---------- Neff	Slight----------	Severe: wetness.	Flooding-------	Wetness, flooding.	Wetness--------	Wetness.
NeC---------- Nella	Moderate: seepage.	Severe: piping.	Deep to water	Droughty, slope.	Large stones---	Large stones, droughty.
NEE*:						
Nella----------	Moderate: seepage.	Severe: piping.	Deep to water	Large stones, droughty, slope.	Slope, large stones.	Large stones, slope, droughty.
Enders----------	Severe: slope.	Moderate: thin layer, hard to pack.	Deep to water	Slope, percs slowly.	Slope, percs slowly.	Slope, percs slowly.
NEF*:						
Nella----------	Severe: slope.	Severe: piping.	Deep to water	Large stones, droughty, slope.	Slope, large stones.	Large stones, slope, droughty.
Enders----------	Severe: slope.	Moderate: thin layer, hard to pack.	Deep to water	Slope, percs slowly.	Slope, percs slowly.	Slope, percs slowly.
OCG*:						
Octavia----------	Severe: slope.	Moderate: piping, large stones.	Deep to water	Slope----------	Slope, large stones.	Large stones, slope.
Carnasaw---------	Severe: slope.	Moderate: thin layer, hard to pack.	Deep to water	Slope, droughty, percs slowly.	Slope, percs slowly.	Slope, droughty, percs slowly.
Caston----------	Severe: slope.	Severe: large stones.	Deep to water	Slope, large stones, droughty.	Slope, large stones.	Large stones, slope, droughty.
Rx---------- Rexor	Moderate: seepage.	Moderate: piping.	Deep to water	Erodes easily, flooding.	Erodes easily	Erodes easily.
SaB---------- Sallisaw	Moderate: seepage.	Moderate: piping.	Deep to water	Erodes easily	Erodes easily	Erodes easily.
SaC---------- Sallisaw	Moderate: seepage, slope.	Slight---------	Deep to water	Slope----------	Erodes easily	Erodes easily.
Sp---------- Spadra	Moderate: seepage.	Severe: piping.	Deep to water	Soil blowing---	Favorable------	Favorable.
Ta, Tf---------- Taft	Moderate: seepage.	Severe: piping.	Percs slowly---	Wetness, percs slowly, rooting depth.	Erodes easily, wetness, rooting depth.	Wetness, erodes easily, rooting depth.
Ud---------- Udorthents	Severe: slope.	Moderate: piping, thin layer.	Deep to water	Slope----------	Slope----------	Slope.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
WbC---------- Wilburton	Moderate: seepage, slope.	Severe: large stones.	Deep to water	Slope, large stones, droughty.	Large stones---	Large stones, droughty.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	> 3 inches	4	10	40	200		
	In				Pct					Pct	
AvB, AvC--------- Avilla	0-6	Silt loam--------	CL-ML, CL	A-4	0	80-100	75-100	65-100	50-90	<30	5-10
	6-12	Fine sandy loam, loam.	SM, SC-SM, CL, CL-ML	A-2, A-4	0	80-100	75-100	55-100	30-90	<30	NP-10
	12-61	Loam, clay loam, sandy clay loam.	CL, SC	A-6, A-4, A-2	0	80-100	75-100	60-100	25-80	25-38	8-15
	61-72	Gravelly loam, very gravelly clay loam, gravelly sandy clay loam.	SC, GC, CL, GP-GC	A-2, A-6, A-7	0-10	35-75	25-75	20-75	12-60	30-45	11-20
CaC-------------- Cane	0-5	Fine sandy loam	ML, SM	A-4	0-2	80-100	75-100	65-95	40-75	<30	NP-7
	5-20	Silty clay loam, loam, clay loam.	ML, CL-ML, CL	A-4, A-6	0-2	90-100	80-100	75-100	60-85	17-32	3-12
	20-64	Silty clay loam, loam, clay loam.	ML, CL-ML, CL	A-4, A-6	0-2	90-100	80-100	75-100	55-85	18-37	3-15
	64-72	Weathered bedrock	---	---	---	---	---	---	---	---	---
CbD-------------- Carnasaw	0-4	Stony silt loam	CL	A-4, A-6	15-25	85-95	85-95	75-95	55-95	30-37	8-14
	4-11	Gravelly fine sandy loam, loam, cobbly silt loam.	SM, SC-SM, GM	A-1, A-2, A-4, A-6	0-25	55-95	55-95	35-95	20-90	30-37	NP-14
	11-27	Silty clay loam, clay loam, clay.	CL, CH	A-6, A-7	0-10	85-95	85-95	75-95	65-90	37-65	18-35
	27-40	Clay, silty clay	CL, CH	A-7	0-10	85-95	85-95	85-90	85-90	41-65	18-35
	40-58	Silty clay, gravelly clay, channery clay.	CL, CH	A-7	0-10	55-90	55-90	55-85	50-80	41-65	18-35
	58-65	Weathered bedrock	---	---	---	---	---	---	---	---	---
CCF*: Carnasaw---------	0-4	Stony silt loam	CL	A-4, A-6	15-25	85-95	85-95	75-95	55-95	30-37	8-14
	4-11	Gravelly fine sandy loam, loam, cobbly silt loam.	SM, SC-SM, GM	A-1, A-2, A-4, A-6	0-25	55-95	55-95	35-95	20-90	30-37	NP-14
	11-27	Silty clay loam, clay loam, clay.	CL, CH	A-6, A-7	0-10	85-95	85-95	75-95	65-90	37-65	18-35
	27-40	Clay, silty clay	CL, CH	A-7	0-10	85-95	85-95	85-90	85-90	41-65	18-35
	40-58	Silty clay, gravelly clay, channery clay.	CL, CH	A-7	0-10	55-90	55-90	55-85	50-80	41-65	18-35
	58-65	Weathered bedrock	---	---	---	---	---	---	---	---	---
Octavia----------	0-4	Stony loam-------	CL, SC	A-4, A-6	15-25	60-90	60-90	55-90	40-75	30-35	9-13
	4-8	Cobbly loam, gravelly loam.	CL, SC	A-4, A-6	15-25	60-90	60-90	55-90	40-75	30-35	9-13
	8-41	Clay loam, sandy clay loam, gravelly clay loam.	CL, SC	A-2, A-4, A-6	0-15	60-90	60-90	50-90	20-80	25-40	8-18
	41-72	Clay loam, clay, shaly clay loam.	CL, CH, SC	A-6, A-7	0-15	55-90	55-90	50-90	45-85	37-60	16-34

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	> 3 inches	4	10	40	200		
	In				Pct					Pct	
CDC*:											
Carnasaw--------	0-4	Gravelly silt loam.	CL, SC, GC	A-4, A-6	0-10	55-95	50-75	50-75	42-73	30-37	8-14
	4-11	Gravelly fine sandy loam, loam, cobbly silt loam.	SM, SC-SM, GM	A-1, A-2, A-4, A-6	0-25	55-95	55-95	35-95	20-90	30-37	NP-14
	11-27	Silty clay loam, clay loam, clay.	CL, CH	A-6, A-7	0-10	85-95	85-95	75-95	65-90	37-65	18-35
	27-40	Clay, silty clay	CL, CH	A-7	0-10	85-95	85-95	85-95	85-90	41-65	18-35
	40-58	Silty clay, gravelly clay, channery clay.	CL, CH	A-7	0-10	55-90	55-90	55-85	50-80	41-65	18-35
	58-65	Weathered bedrock	---	---	---	---	---	---	---	---	---
Sherless--------	0-3	Gravelly fine sandy loam.	SM, SC, SC-SM	A-2, A-4	0-10	65-90	60-85	55-80	15-49	<26	NP-8
	3-7	Fine sandy loam, cobbly fine sandy loam, gravelly fine sandy loam.	SM, SC-SM	A-2, A-4	0-25	65-100	60-100	50-85	15-50	15-25	NP-7
	7-27	Clay loam, sandy clay loam, gravelly clay loam.	CL, SC	A-2, A-4, A-6	0-10	70-95	65-90	40-85	15-80	25-40	8-18
	27-40	Weathered bedrock	---	---	---	---	---	---	---	---	---
CDE*:											
Carnasaw--------	0-4	Cobbly silt loam	CL, SC, CL-ML, SM	A-4, A-6 A-2	10-25	85-95	85-95	60-95	35-90	30-37	NP-14
	4-11	Gravelly fine sandy loam, loam, cobbly silt loam.	SM, SC-SM, GM	A-1, A-2, A-4, A-6	0-25	55-95	55-95	35-95	20-90	30-37	NP-14
	11-27	Silty clay loam, clay loam, clay.	CL, CH	A-6, A-7	0-10	85-95	75-95	70-95	55-95	37-65	18-35
	27-40	Clay, silty clay	CL, CH	A-7	0-10	85-95	75-95	70-95	60-95	41-65	18-35
	40-58	Silty clay, gravelly clay, clay.	CL, CH	A-7	0-10	55-90	55-90	55-85	50-80	41-65	18-35
	58-65	Weathered bedrock	---	---	---	---	---	---	---	---	---
Sherless--------	0-3	Cobbly fine sandy loam.	SM, SC, SC-SM	A-2, A-4	15-30	65-90	60-85	55-80	15-49	<26	NP-8
	3-7	Fine sandy loam, cobbly fine sandy loam, gravelly fine sandy loam.	SM, SC-SM	A-2, A-4	0-25	65-100	60-100	50-85	15-50	15-25	NP-7
	7-27	Clay loam, sandy clay loam, gravelly clay loam.	CL, SC	A-2, A-4, A-6	0-25	70-95	65-90	40-85	15-80	25-40	8-18
	27-40	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	> 3 inches	4	10	40	200		
	In				Pct					Pct	
CDF*:											
Carnasaw--------	0-4	Stony silt loam	CL	A-4, A-6	15-25	85-95	85-95	75-95	55-95	30-37	8-14
	4-11	Gravelly fine sandy loam, loam, cobbly silt loam.	SM, SC-SM, GM	A-1, A-2, A-4, A-6	0-25	55-95	55-95	35-95	20-90	30-37	NP-14
	11-27	Silty clay loam, clay loam, clay.	CL, CH	A-6, A-7	0-10	85-95	85-95	75-95	65-90	37-65	18-35
	27-40	Clay, silty clay	CL, CH	A-7	0-10	85-95	85-95	85-90	85-90	41-65	18-35
	40-58	Silty clay, gravelly clay, clay.	CL, CH	A-7	0-10	55-90	55-90	55-85	50-80	41-65	18-35
	58-65	Weathered bedrock	---	---	---	---	---	---	---	---	---
Sherless--------	0-3	Stony fine sandy loam.	SM, SC-SM	A-2, A-4	15-25	65-95	60-90	55-80	15-50	15-25	NP-7
	3-7	Fine sandy loam, cobbly fine sandy loam, gravelly fine sandy loam.	SM, SC-SM	A-2, A-4	0-25	70-100	65-100	40-85	15-50	15-25	NP-7
	7-27	Clay loam, sandy clay loam, gravelly clay loam.	CL, SC	A-2, A-4, A-6	0-25	70-100	65-100	40-100	15-80	25-40	8-16
	27-40	Weathered bedrock	---	---	---	---	---	---	---	---	---
CNC*:											
Carnasaw--------	0-4	Gravelly silt loam.	CL, SC, GC	A-4, A-6	0-10	55-95	50-75	50-75	42-73	30-37	8-14
	4-11	Gravelly fine sandy loam, loam, cobbly silt loam.	SM, SC-SM, GM	A-1, A-2, A-4, A-6	0-25	55-95	55-95	35-95	20-90	30-37	NP-14
	11-27	Silty clay loam, clay loam, clay.	CL, CH	A-6, A-7	0-10	85-95	85-95	75-95	65-90	37-65	18-35
	27-40	Clay, silty clay	CL, CH	A-7	0-10	85-95	85-95	85-95	85-90	41-65	18-35
	40-58	Silty clay, gravelly clay, clay.	CL, CH	A-7	0-10	55-90	55-90	55-85	50-80	41-65	18-35
	58-65	Weathered bedrock	---	---	---	---	---	---	---	---	---
Sherless--------	0-3	Gravelly fine sandy loam.	SM, SC, SC-SM	A-2, A-4	0-15	65-90	60-85	55-80	15-49	<26	NP-8
	3-7	Fine sandy loam, cobbly fine sandy loam, gravelly fine sandy loam.	SM, SC-SM	A-2, A-4	0-25	65-100	60-100	50-85	15-50	15-25	NP-7
	7-27	Clay loam, sandy clay loam, gravelly clay loam.	CL, SC	A-2, A-4, A-6	0-25	70-95	65-90	40-85	15-80	25-40	8-18
	27-40	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	> 3 inches	4	10	40	200		
	In				Pct					Pct	
CNC*:											
Clebit----------	0-4	Very stony fine sandy loam.	SM, SC-SM, ML, CL-ML	A-2, A-4	10-50	70-90	65-85	45-80	25-60	<25	NP-7
	4-16	Very gravelly loam, extremely gravelly fine sandy loam, very cobbly fine sandy loam.	GM, GC, SC, SC-SM	A-1, A-2, A-4	0-50	25-70	20-70	15-70	12-50	<25	NP-8
	16-18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
CNE*:											
Carnasaw--------	0-4	Cobbly silt loam	CL, SC, CL-ML, SM	A-4, A-6	10-25	85-95	85-95	60-95	35-90	30-37	NP-14
	4-11	Gravelly fine sandy loam, loam, cobbly silt loam.	SM, SC-SM, GM	A-1, A-2, A-4, A-6	0-10	55-95	55-95	35-95	20-90	30-37	NP-14
	11-27	Silty clay loam, clay loam, clay.	CL, CH	A-6, A-7	0-10	85-95	75-95	70-95	55-95	37-65	18-35
	27-40	Clay, silty clay	CL, CH	A-7	0-10	85-95	75-95	70-95	60-95	41-65	18-35
	40-58	Silty clay, gravelly clay, clay.	CL, CH	A-7	0-10	55-90	55-90	55-85	50-80	41-65	18-35
	58-65	Weathered bedrock	---	---	---	---	---	---	---	---	---
Sherless--------	0-3	Cobbly fine sandy loam.	SM, SC, SC-SM	A-2, A-4	15-30	65-90	60-85	55-80	15-49	<26	NP-8
	3-7	Fine sandy loam, cobbly fine sandy loam, gravelly fine sandy loam.	SM, SC-SM	A-2, A-4	0-25	65-100	60-100	50-85	15-50	15-25	NP-7
	7-27	Clay loam, sandy clay loam, gravelly clay loam.	CL, SC	A-2, A-4, A-6	0-25	70-95	65-90	40-85	15-80	25-40	8-18
	27-40	Weathered bedrock	---	---	---	---	---	---	---	---	---
Clebit----------	0-4	Very stony fine sandy loam.	SM, SC-SM, ML, CL-ML	A-2, A-4	25-50	70-90	65-85	45-80	25-60	<25	NP-7
	4-16	Very gravelly loam, extremely gravelly fine sandy loam, very cobbly fine sandy loam.	GM, GC, SC, SC-SM	A-1, A-2, A-4	0-50	25-70	20-70	15-70	12-50	<25	NP-8
	16-18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	> 3 inches	4	10	40	200		
	In				Pct					Pct	
CNF*:											
Carnasaw--------	0-4	Stony silt loam	CL	A-4, A-6	15-25	85-95	85-95	75-95	55-95	30-37	8-14
	4-11	Gravelly fine sandy loam, loam, cobbly silt loam.	SM, SC-SM, GM	A-1, A-2, A-4, A-6	0-10	55-95	55-95	35-95	20-90	30-37	NP-14
	11-27	Silty clay loam, clay loam, clay.	CL, CH	A-6, A-7	0-10	85-95	85-95	75-95	65-90	37-65	18-35
	27-40	Clay, silty clay	CL, CH	A-7	0-10	85-95	85-95	85-90	85-90	41-65	18-35
	40-58	Silty clay, gravelly clay, clay.	CL, CH	A-7	0-10	55-90	55-90	55-85	50-80	41-65	18-35
	58-65	Weathered bedrock	---	---	---	---	---	---	---	---	---
Sherless--------	0-3	Stony fine sandy loam.	SM, SC-SM	A-2, A-4	15-25	65-95	60-90	55-80	15-50	15-25	NP-7
	3-7	Fine sandy loam, cobbly fine sandy loam, gravelly fine sandy loam.	SM, SC-SM	A-2, A-4	0-25	65-100	60-100	50-85	15-50	15-25	NP-7
	7-27	Clay loam, sandy clay loam, gravelly clay loam.	CL, SC	A-2, A-4, A-6	0-25	70-100	65-100	40-100	15-80	25-40	8-16
	27-40	Weathered bedrock	---	---	---	---	---	---	---	---	---
Clebit----------	0-4	Very stony fine sandy loam.	SM, SC-SM, ML, CL-ML	A-2, A-4	20-50	70-90	65-85	45-80	25-60	<25	NP-7
	4-16	Very gravelly loam, extremely gravelly fine sandy loam, very cobbly fine sandy loam.	GM, GC, SC, SC-SM	A-1, A-2, A-4	0-50	25-70	20-70	15-70	12-50	<25	NP-8
	16-18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Cr--------------- Ceda	0-7	Very cobbly loam	SM, SC-SM, ML, CL-ML	A-2, A-4	20-50	70-95	60-90	40-90	25-80	22-29	2-7
	7-72	Cobbly loam, very cobbly silt loam, very gravelly loam.	GP-GC, GC, GM-GC	A-2, A-4, A-6	5-20	15-50	15-50	10-50	5-45	25-40	7-18
CSG*:											
Clebit----------	0-4	Very stony fine sandy loam.	SM, SC-SM, ML, CL-ML	A-2, A-4	20-50	70-90	65-85	45-80	25-60	<25	NP-7
	4-16	Very gravelly loam, extremely gravelly fine sandy loam, very cobbly fine sandy loam.	GM, GC, SC, SC-SM	A-1, A-2, A-4	0-50	25-70	20-70	15-70	12-50	<25	NP-8
	16-18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	> 3 inches	4	10	40	200		
	In				Pct					Pct	
CSG*:											
Sherless	0-3	Stony fine sandy loam.	SM, SC-SM	A-2, A-4	15-25	90-95	85-90	60-80	30-50	15-25	NP-7
	3-7	Fine sandy loam, cobbly fine sandy loam, gravelly fine sandy loam.	SM, SC-SM	A-2, A-4	0-25	85-100	70-100	50-85	30-50	15-25	NP-7
	7-27	Clay loam, sandy clay loam, gravelly clay loam.	CL, SC	A-2, A-4, A-6	0-25	70-100	65-100	40-100	15-80	25-40	8-16
	27-40	Weathered bedrock	---	---	---	---	---	---	---	---	---
Carnasaw	0-4	Very stony silt loam.	CL, CL-ML, SC-SM, ML	A-4, A-6, A-2	25-50	75-95	75-95	55-95	30-90	30-37	NP-14
	4-11	Cobbly fine sandy loam, cobbly silt loam, loam.	SM, SC-SM, SC, CL-ML	A-2, A-4, A-6, A-1	0-25	85-95	55-95	35-95	20-90	30-37	NP-14
	11-27	Silty clay loam, clay loam, clay.	CL, CH	A-6, A-7	0-10	85-95	85-95	75-95	65-90	37-65	18-35
	27-40	Clay, silty clay	CL, CH	A-7	0-10	85-95	85-95	85-90	85-90	41-65	18-35
	40-58	Silty clay, gravelly clay, clay.	CL, CH	A-7	0-10	55-90	55-90	55-85	50-80	41-65	18-35
	58-65	Weathered bedrock	---	---	---	---	---	---	---	---	---
Cu	0-8	Silt loam	CL, CL-ML	A-4, A-6	0	100	100	96-100	80-97	25-37	5-13
Cupco	8-61	Silty clay loam, silt loam.	CL, CL-ML	A-6, A-7	0	100	100	98-100	90-98	25-42	8-19
	61-80	Silty clay loam, clay loam.	CL	A-6, A-7	0	100	100	96-100	80-98	33-43	12-20
EdC, EdE	0-4	Gravelly silt loam.	CL-ML, GM-GC, SC, CL	A-2, A-4, A-6, A-1	0-10	50-75	50-75	30-70	20-60	20-35	5-14
Enders	4-9	Gravelly fine sandy loam, loam, gravelly silt loam.	CL-ML, GM-GC, SC, CL	A-4, A-2, A-6, A-1	0-10	50-100	50-100	30-90	20-90	20-35	5-14
	9-45	Silty clay, clay, gravelly silty clay loam.	CH, CL, SC	A-7	0	95-100	80-100	70-100	35-95	40-65	20-40
	45-57	Silty clay, channery silty clay, clay.	CH, GC, CL, SC	A-7, A-2	0-10	55-100	25-90	25-90	20-90	45-65	25-40
	57-65	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	> 3 inches	4	10	40	200		
	In				Pct					Pct	
EdF---------- Enders	0-4	Stony silt loam	SC, CL, SC-SM, CL-ML	A-2, A-4, A-1	15-25	80-95	75-95	35-70	20-60	20-30	4-10
	4-9	Loam, stony sandy loam, stony silt loam.	SC, CL, SC-SM, CL-ML	A-2, A-4, A-1	0-25	80-95	75-95	35-70	20-60	20-30	4-10
	9-45	Silty clay, clay, gravelly silty clay loam.	CH, CL, SC	A-7	0-5	95-100	80-100	70-100	35-95	40-65	20-40
	45-57	Silty clay, channery silty clay, very channery clay.	CH, GC, SC, CL	A-7, A-2	0-10	55-100	25-90	25-90	20-90	45-65	25-40
	57-66	Weathered bedrock	---	---	---	---	---	---	---	---	---
EME*, EMF*, EMG*: Enders----------	0-4	Stony silt loam	SC, CL, SC-SM, CL-ML	A-2, A-4, A-1	15-25	80-95	75-95	35-70	20-60	20-30	4-10
	4-9	Loam, stony sandy loam, stony silt loam.	SC, CL, SC-SM, CL-ML	A-2, A-4, A-1	0-25	80-95	75-95	35-70	20-60	20-30	4-10
	9-45	Silty clay, clay, gravelly silty clay loam.	CH, CL, SC	A-7	0-5	95-100	80-100	70-100	35-95	40-65	20-40
	45-57	Silty clay, channery silty clay, very channery clay.	CH, GC, SC, CL	A-7, A-2	0-10	55-100	25-90	25-90	20-90	45-65	25-40
	57-66	Weathered bedrock	---	---	---	---	---	---	---	0-14	---
Mountainburg----	0-4	Stony fine sandy loam.	SM, SC-SM, ML, CL-ML	A-1, A-2, A-4	15-25	75-95	75-95	40-85	20-65	15-25	NP-7
	4-9	Cobbly fine sandy loam, gravelly fine sandy loam, cobbly loam.	SM, SC-SM, ML, CL-ML	A-1, A-2, A-4	0-25	80-95	50-95	35-85	20-65	15-25	NP-7
	9-16	Extremely gravelly fine sandy loam, very cobbly loam, very gravelly sandy clay loam.	GC, GM-GC, SC, GP-GC	A-1, A-2, A-4, A-6	5-50	35-85	30-85	10-60	5-45	25-35	5-15
	16-20	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
EwC---------- Endsaw	0-4	Gravelly loam----	CL-ML, ML, CL, GM	A-2, A-4	0-15	60-80	50-75	40-70	30-65	22-32	2-10
	4-51	Silty clay, gravelly silty clay, channery silty clay.	CL, CH	A-7	0-15	75-100	70-98	68-96	65-95	41-60	18-32
	51-72	Weathered bedrock	---	---	---	---	---	---	---	---	---
EwE---------- Endsaw	0-4	Cobbly loam------	CL-ML, ML, GC, SC	A-4, A-6	15-30	65-95	60-90	50-85	40-75	24-31	3-9
	4-51	Silty clay, channery silty clay.	CL, CH	A-7	0-15	75-100	70-98	68-96	65-95	41-60	18-32
	51-72	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	> 3 inches	4	10	40	200		
	In				Pct					Pct	
EwF---------- Endsaw	0-4	Stony loam-------	CL-ML, ML, GC, SC	A-4, A-6	15-30	65-95	60-90	50-85	40-75	24-31	3-9
	4-51	Silty clay, channery silty clay.	CL, CH	A-7	0-15	75-100	70-98	68-96	65-95	41-60	18-32
	51-72	Weathered bedrock	---	---	---	---	---	---	---	---	---
Ka---------- Kenn	0-9	Gravelly fine sandy loam.	SM, SC-SM	A-2, A-4, A-1	0-15	50-75	50-75	40-75	15-45	<26	NP-7
	9-27	Clay loam, sandy clay loam, gravelly clay loam.	CL, SC	A-2, A-4, A-6	0-15	50-90	50-90	35-90	15-80	25-40	8-18
	27-42	Very gravelly sandy clay loam, very gravelly clay loam, cobbly sandy clay loam.	GC, GP-GC	A-2, A-4, A-6	0-25	25-50	25-50	20-50	10-45	25-40	8-18
	42-72	Cobbly loam, very gravelly loam, extremely gravelly loam.	GC, GM, GP-GC, GP-GM	A-1, A-2, A-4	5-50	15-50	15-50	10-50	5-45	<31	NP-10
KC*:											
Kenn----------	0-9	Gravelly fine sandy loam.	SM, SC-SM	A-2, A-4, A-1	0-15	50-75	50-75	40-75	15-45	<26	NP-7
	9-27	Clay loam, sandy clay loam, gravelly clay loam.	CL, SC	A-2, A-4, A-6	0-15	50-90	50-90	35-90	15-80	25-40	8-18
	27-42	Very gravelly sandy clay loam, very gravelly clay loam, cobbly sandy clay loam.	GC, GP-GC	A-2, A-4, A-6	0-25	25-50	25-50	20-50	10-45	25-40	8-18
	42-72	Cobbly loam, very gravelly loam, extremely gravelly loam.	GC, GM, GP-GC, GP-GM	A-1, A-2, A-4	5-50	15-50	15-50	10-50	5-45	<31	NP-10
Ceda----------	0-7	Very cobbly loam	SM, SC-SM, ML, CL-ML	A-2, A-4	25-50	70-95	60-90	40-90	25-80	22-29	2-7
	7-72	Cobbly loam, very cobbly silt loam, very gravelly loam.	GP-GC, GP-GM, GM-GC	A-2, A-4, A-6	5-40	15-50	15-50	10-50	5-45	25-40	7-18
LMC*:											
Linker----------	0-6	Gravelly fine sandy loam.	GM, SM, SC-SM, GM-GC	A-2, A-4, A-1-B	0-5	50-75	50-75	35-70	20-50	<25	NP-7
	6-13	Fine sandy loam, gravelly loam, sandy clay loam.	SC, CL, CL-ML, SC-SM	A-4, A-2, A-1, A-6	0-5	50-100	50-100	40-95	20-75	20-35	5-15
	13-28	Sandy clay loam, loam, gravelly loam.	CL, SC, GC, CL-ML	A-4, A-6, A-2	0-10	50-100	50-100	40-95	20-80	23-38	6-15
	28-36	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	> 3 inches	4	10	40	200		
	In				Pct					Pct	
LMC*:											
Mountainburg----	0-4	Stony fine sandy loam.	SM, SC-SM, ML, CL-ML	A-1, A-2, A-4	15-25	75-95	75-95	40-85	20-65	15-25	NP-7
	4-9	Gravelly fine sandy loam, stony sandy loam, cobbly loam.	SM, SC-SM, ML, CL-ML	A-1, A-2, A-4	5-25	80-95	50-95	35-85	20-65	15-25	NP-7
	9-16	Extremely gravelly fine sandy loam, very cobbly loam, very gravelly sandy clay loam.	GC, GM-GC, SC, GP-GC	A-1, A-2, A-4, A-6	5-50	35-85	30-85	10-60	5-45	25-35	5-15
	16-20	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
LvB, LvC---------- Leadvale	0-8	Silt loam--------	ML, CL-ML, CL	A-4	0	100	95-100	85-95	65-85	18-32	2-10
	8-25	Silt loam, silty clay loam.	CL-ML, CL, ML	A-4, A-6	0	100	95-100	90-98	75-90	22-36	3-14
	25-65	Silt loam, silty clay loam.	CL-ML, CL, ML	A-4, A-6, A-7	0	100	95-100	80-98	70-90	23-42	3-18
	65-72	Silty clay loam, silty clay.	CL, MH, ML, CH	A-6, A-7	0-5	90-100	90-100	85-95	70-90	32-58	12-26
Na---------- Neff	0-13	Silt loam--------	CL	A-4, A-6	0	100	100	96-100	65-97	30-37	8-14
	13-59	Silt loam, silty clay loam.	CL	A-6, A-7	0	100	100	96-100	80-98	30-42	11-19
	59-72	Silt loam, silty clay loam.	CL	A-4, A-6, A-7	0	100	100	96-100	80-98	30-42	8-19
NeC---------- Nella	0-8	Gravelly fine sandy loam.	ML, CL, GM, SM	A-4, A-2	0-10	65-90	60-80	55-65	30-55	<30	NP-8
	8-52	Clay loam, gravelly loam, cobbly sandy clay loam.	CL, SC, CL-ML, SC-SM	A-4, A-6, A-2	0-25	75-95	60-90	45-70	30-60	25-40	6-20
	52-72	Cobbly clay loam, gravelly sandy clay loam, cobbly clay.	SC, SM, CL, ML	A-4, A-6, A-7	0-25	85-95	75-90	65-80	40-65	30-55	8-27
NEE*:											
Nella----------	0-8	Cobbly fine sandy loam.	ML, CL, SM, SC	A-4	15-25	90-100	85-90	65-75	36-55	<30	NP-8
	8-52	Clay loam, gravelly loam, cobbly sandy clay loam.	CL, SC, CL-ML, SC-SM	A-4, A-6, A-2	0-25	75-95	60-90	45-70	30-60	25-40	6-20
	52-72	Cobbly clay loam, gravelly sandy clay loam, cobbly clay.	SC, SM, CL, ML	A-4, A-6, A-7	0-25	85-95	75-90	65-80	40-65	30-55	8-27

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	> 3 inches	4	10	40	200		
	In				Pct					Pct	
NEE*:											
Enders----------	0-4	Cobbly silt loam	SC, CL, SC-SM, CL-ML	A-1, A-2, A-4, A-6	15-30	80-95	75-95	35-70	20-60	20-35	5-14
	4-9	Cobbly silt loam, gravelly loam, loam.	SC, CL, SC-SM, CL-ML	A-1, A-2, A-4, A-6	0-20	75-100	70-100	40-95	20-90	20-35	5-14
	9-45	Silty clay, clay, gravelly silty clay loam.	CH, CL, SC, GC	A-7	0-5	80-100	70-100	45-100	35-90	40-65	20-40
	45-57	Silty clay, channery silty clay, very channery clay.	CH, GC, SC, CL	A-7, A-2-7	0-10	55-100	25-90	25-90	25-90	45-65	25-40
	57-66	Weathered bedrock	---	---	---	---	---	---	---	---	---
NEF*:											
Nella----------	0-8	Stony fine sandy loam.	ML, CL, SM, SC	A-4	15-30	90-100	85-90	65-75	36-55	<30	NP-8
	8-52	Gravelly loam, gravelly sandy clay loam, cobbly clay loam.	CL, SC, CL-ML, SC-SM	A-4, A-6, A-2	0-30	75-95	60-90	45-70	30-60	25-40	6-20
	52-72	Clay loam, gravelly sandy clay loam, cobbly clay loam.	SC, SM, CL, ML	A-4, A-6, A-7	0-25	85-95	75-90	65-80	40-65	30-55	8-27
Enders----------	0-4	Stony silt loam	SC, CL, SC-SM, CL-ML	A-2, A-4, A-1	15-35	80-95	75-95	35-70	20-60	20-30	4-10
	4-9	Stony loam, loam, stony silt loam.	SC, CL, SC-SM,	A-2, A-4, A-1	5-35	80-95	75-95	35-70	20-60	20-30	4-10
	9-45	Silty clay, clay, gravelly silty clay loam.	CH, CL, SC	A-7	0-5	95-100	70-100	45-100	35-95	40-65	20-40
	45-57	Silty clay, channery silty clay, very channery clay.	CH, GC, SC, CL	A-7, A-2	0-10	55-100	25-90	25-90	20-90	45-65	25-40
	57-66	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	> 3 inches	4	10	40	200		
	In				Pct					Pct	
OCG*:											
Octavia---------	0-4	Very stony loam	CL, SC, CL-ML, SC-SM	A-2, A-4	30-50	60-90	60-90	45-85	25-65	15-30	3-10
	4-8	Cobbly loam, cobbly fine sandy loam, stony loam.	ML, SM, CL-ML, SC-SM	A-2, A-4	5-35	60-90	60-90	45-85	25-65	15-25	3-7
	8-13	Fine sandy loam, gravelly loam, loam.	CL, SC, SL-ML, SC-SM	A-2, A-4	0-15	60-90	60-90	45-85	25-65	15-30	3-10
	13-41	Clay loam, sandy clay loam, gravelly clay loam.	CL, SC, GC	A-2, A-4, A-6	0-15	60-90	60-90	50-90	25-70	25-40	8-15
	41-72	Clay loam, clay, channery silty clay.	CL, CH, SC, ML	A-6, A-7, A-2	0-30	55-90	55-90	50-90	40-85	37-60	16-28
Carnasaw--------	0-4	Very stony silt loam.	CL, CL-ML, SC-SM, ML	A-4, A-6, A-2	30-50	75-95	75-95	55-95	30-90	30-37	NP-14
	4-11	Cobbly fine sandy loam, cobbly silt loam, loam.	SM, SC-SM, SC, CL-ML	A-2, A-4, A-6, A-1	0-25	85-95	55-95	35-95	20-90	30-37	NP-14
	11-27	Silty clay loam, clay loam, clay.	CL, CH	A-6, A-7	0-10	85-95	85-95	75-95	65-90	37-65	18-35
	27-40	Clay, silty clay	CL, CH	A-7	0-10	85-95	85-95	85-90	85-90	41-65	18-35
	40-58	Silty clay, channery silty clay, clay.	CL, CH	A-7	0-10	55-90	55-90	55-85	50-80	41-65	18-35
	58-65	Weathered bedrock	---	---	---	---	---	---	---	---	---
Caston----------	0-4	Very stony fine sandy loam.	ML, SM, CL-ML, SC-SM	A-2, A-4	30-50	65-90	60-85	45-80	25-60	<25	2-7
	4-9	Very cobbly loam, gravelly fine sandy loam, very cobbly fine sandy loam.	ML, CL-ML, GM, SM	A-1, A-2, A-4	5-50	55-85	50-75	35-70	20-55	<25	2-7
	9-21	Very cobbly loam, very gravelly loam, very gravelly fine sandy loam.	GM, GP-GM, SM, SC-SM	A-1, A-2, A-4	5-50	25-75	20-70	15-65	8-50	<30	2-7
	21-72	Extremely gravelly clay loam, very gravelly sandy clay loam, very cobbly clay loam.	SC, GC, GP-GC	A-2, A-4, A-6	5-50	25-55	20-50	15-50	7-40	25-40	8-15
Rx----------	0-7	Loam----------	ML, CL,	A-4, A-6	0	98-100	98-100	96-100	65-97	22-37	3-14
Rexor	7-49	Clay loam, silt loam, silty clay loam.	CL-ML	A-4, A-6,	0	98-100	98-100	96-100	80-98	30-40	8-17
	49-72	Loam, silt loam	CL	A-4, A-6	0	98-100	98-100	96-100	70-97	30-37	8-14

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	> 3 inches	4	10	40	200		
	In				Pct					Pct	
SaB, SaC---------- Sallisaw	0-5	Silt loam--------	CL, ML, SM, SC	A-2, A-4	0	75-100	75-100	70-100	25-97	20-30	NP-10
	5-49	Loam, clay loam, sandy clay loam.	SC, CL, GC	A-2, A-4, A-6	0	50-100	50-100	45-95	17-90	25-40	8-18
	49-72	Very gravelly loam, very gravelly silt loam, very gravelly clay loam.	GC	A-2, A-4, A-6	0-10	20-50	20-50	20-50	13-49	25-40	8-18
Sp---------- Spadra	0-8	Fine sandy loam	SM, SC-SM	A-4, A-2	0	85-100	75-100	55-85	30-50	<25	NP-7
	8-38	Loam, sandy clay loam, clay loam.	CL, SC, SC-SM, ML	A-4, A-6, A-2	0	90-100	70-100	60-100	25-95	20-38	3-15
	38-72	Fine sandy loam, sandy loam, gravelly loam.	CL, SC-SM, SC, CL-ML	A-4, A-2, A-1	0	60-100	50-100	40-95	20-75	<30	NP-10
Ta, Tf---------- Taft	0-7	Silt loam--------	CL-ML, ML	A-4	0	100	95-100	90-100	75-95	18-30	2-10
	7-24	Silt loam, silty clay loam, silt.	CL-ML, CL	A-4, A-6	0	100	95-100	95-100	85-95	23-38	5-16
	24-58	Silt loam, silty clay loam.	CL-ML, CL	A-4, A-6, A-7	0	95-100	90-100	85-100	80-95	23-42	5-20
	58-72	Silty clay loam, silty clay.	ML, GC, CL	A-6, A-7	0-15	65-100	55-100	45-90	36-85	35-48	12-22
Ud---------- Udorthents	0-60	Variable---------	---	---	---	---	---	---	---	---	---
WbC---------- Wilburton	0-7	Very cobbly loam	ML, CL, CL-ML, SC-SM	A-2, A-4	40-60	80-95	75-90	55-85	30-65	<30	2-10
	7-15	Cobbly loam, very cobbly loam, cobbly clay loam.	ML, CL, SM, SC	A-2, A-4, A-6	25-60	80-95	75-95	55-90	30-70	<40	4-13
	15-38	Very gravelly loam, very cobbly loam, very cobbly sandy clay loam.	GC, SC	A-2, A-4, A-6	25-45	45-75	40-70	35-65	15-50	25-35	8-13
	38-72	Extremely gravelly loam, extremely cobbly sandy clay loam, extremely cobbly loam.	GC, SC	A-2, A-4, A-6	40-65	45-60	40-55	35-55	15-45	25-35	8-13

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cc	In/hr	In/in	pH				Pct
AvB, AvC----------	0-6	15-27	1.35-1.50	0.6-2.0	0.14-0.18	4.5-5.5	Low----------	0.37	5	.5-2
Avilla	6-12	8-27	1.30-1.50	0.6-6.0	0.10-0.18	4.5-5.5	Low----------	0.24		
	12-61	20-35	1.35-1.50	0.6-2.0	0.14-0.18	4.5-5.5	Low----------	0.28		
	61-72	25-40	1.35-1.55	0.6-2.0	0.08-0.17	4.5-5.5	Low----------	0.24		
CaC----------	0-5	7-18	1.45-1.65	0.6-2.0	0.10-0.18	5.1-6.0	Low----------	0.28	4	.5-2
Cane	5-20	18-35	1.55-1.75	0.6-2.0	0.14-0.19	4.5-6.0	Low----------	0.37		
	20-64	18-35	1.60-1.80	0.06-0.2	0.05-0.08	4.5-6.0	Low----------	0.37		
	64-72	---	---	---	---	---	----------	---		
CbD----------	0-11	15-26	1.30-1.60	0.6-2.0	0.10-0.16	5.1-6.0	Low----------	0.32	4	.5-2
Carnasaw	11-27	35-45	1.45-1.70	0.2-0.6	0.10-0.19	4.5-5.5	High---------	0.32		
	27-40	40-65	1.35-1.60	0.06-0.2	0.10-0.15	4.5-5.5	High---------	0.32		
	40-58	40-65	1.35-1.60	0.06-0.2	0.08-0.12	4.5-5.5	High---------	0.32		
	58-65	---	---	---	---	---	----------	----		
CCF*:										
Carnasaw--------	0-11	15-26	1.30-1.60	0.6-2.0	0.10-0.16	5.1-6.0	Low----------	0.32	4	.5-2
	11-27	35-45	1.45-1.70	0.2-0.6	0.10-0.19	4.5-5.5	High---------	0.32		
	27-40	40-65	1.35-1.60	0.06-0.2	0.10-0.15	4.5-5.5	High---------	0.32		
	40-58	40-65	1.35-1.60	0.06-0.2	0.08-0.12	4.5-5.5	High---------	0.32		
	58-65	---	---	---	---	---	----------	----		
Octavia---------	0-8	15-20	1.30-1.55	0.6-2.0	0.10-0.19	5.1-6.0	Low----------	0.32	5	.5-2
	8-41	20-35	1.45-1.70	0.6-2.0	0.08-0.19	4.5-5.5	Low----------	0.28		
	41-72	35-60	1.35-1.65	0.2-0.6	0.08-0.19	4.5-5.5	Moderate-----	0.28		
CDC*:										
Carnasaw--------	0-11	15-26	1.30-1.60	0.6-2.0	0.10-0.16	5.1-6.0	Low----------	0.32	4	.5-2
	11-27	35-45	1.45-1.70	0.2-0.6	0.10-0.19	4.5-5.5	High---------	0.32		
	27-40	40-65	1.35-1.60	0.06-0.2	0.10-0.15	4.5-5.5	High---------	0.32		
	40-58	40-65	1.35-1.60	0.06-0.2	0.08-0.12	4.5-5.5	High---------	0.32		
	58-65	---	---	---	---	---	----------	----		
Sherless--------	0-7	5-18	1.30-1.60	2.0-6.0	0.08-0.13	5.1-6.0	Low----------	0.20	3	.5-2
	7-27	20-35	1.45-1.70	0.6-2.0	0.09-0.18	4.5-5.5	Low----------	0.28		
	27-40	---	---	---	---	---	----------	----		
CDE*:										
Carnasaw--------	0-4	10-26	1.30-1.60	0.6-2.0	0.08-0.18	5.1-6.0	Low----------	0.32	4	.5-2
	4-11	10-26	1.30-1.60	0.6-2.0	0.08-0.18	5.1-6.0	Low----------	0.32		
	11-27	35-45	1.45-1.70	0.2-0.6	0.10-0.19	4.5-5.5	High---------	0.32		
	27-40	40-65	1.35-1.60	0.06-0.2	0.10-0.15	4.5-5.5	High---------	0.32		
	40-58	40-65	1.35-1.60	0.06-0.2	0.08-0.12	4.5-5.5	High---------	0.32		
	58-65	---	---	---	---	---	----------	----		
Sherless--------	0-7	5-18	1.30-1.60	2.0-6.0	0.08-0.12	5.1-6.0	Low----------	0.20	3	.5-2
	7-27	20-35	1.45-1.70	0.6-2.0	0.09-0.18	4.5-5.5	Low----------	0.28		
	27-40	---	---	---	---	---	----------	----		
CDF*:										
Carnasaw--------	0-11	15-26	1.30-1.60	0.6-2.0	0.10-0.16	5.1-6.0	Low----------	0.32	4	.5-2
	11-27	35-45	1.45-1.70	0.2-0.6	0.10-0.19	4.5-5.5	High---------	0.32		
	27-40	40-65	1.35-1.60	0.06-0.2	0.10-0.15	4.5-5.5	High---------	0.32		
	40-58	40-65	1.35-1.60	0.06-0.2	0.08-0.12	4.5-5.5	High---------	0.32		
	58-65	---	---	---	---	---	----------	----		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cc	In/hr	In/in	pH				Pct
CDF*:										
Sherless	0-3	5-18	1.30-1.60	2.0-6.0	0.08-0.10	5.1-6.0	Low	0.20	3	.5-2
	3-7	5-18	1.35-1.60	2.0-6.0	0.08-0.12	5.1-6.0	Low	0.20		
	7-27	20-35	1.35-1.60	0.6-2.0	0.13-0.18	4.5-5.5	Low	0.28		
	27-40	---	---	---	---	---	---	---		
CNC*:										
Carnasaw	0-11	15-26	1.30-1.60	0.6-2.0	0.10-0.16	5.1-6.0	Low	0.32	4	.5-2
	11-27	35-45	1.45-1.70	0.2-0.6	0.10-0.19	4.5-5.5	High	0.32		
	27-40	40-65	1.35-1.60	0.06-0.2	0.10-0.15	4.5-5.5	High	0.32		
	40-58	40-65	1.35-1.60	0.06-0.2	0.08-0.12	4.5-5.5	High	0.32		
	58-65	---	---	---	---	---	---	---		
Sherless	0-7	5-18	1.30-1.60	2.0-6.0	0.08-0.13	5.1-6.0	Low	0.20	3	.5-2
	7-27	20-35	1.45-1.70	0.6-2.0	0.09-0.18	4.5-5.5	Low	0.28		
	27-40	---	---	---	---	---	---	---		
Clebit	0-4	10-20	1.30-1.60	2.0-6.0	0.05-0.10	5.1-6.0	Low	0.15	1	.5-2
	4-16	10-20	1.30-1.60	2.0-6.0	0.04-0.10	4.5-5.5	Low	0.15		
	16-18	---	---	---	---	---	---	---		
CNE*:										
Carnasaw	0-4	10-26	1.30-1.60	0.6-2.0	0.08-0.18	5.1-6.0	Low	0.32	4	.5-2
	4-11	10-26	1.30-1.60	0.6-2.0	0.08-0.18	5.1-6.0	Low	0.32		
	11-27	35-45	1.45-1.70	0.2-0.6	0.10-0.19	4.5-5.5	High	0.32		
	27-40	40-65	1.35-1.60	0.06-0.2	0.10-0.15	4.5-5.5	High	0.32		
	40-58	40-65	1.35-1.60	0.06-0.2	0.08-0.12	4.5-5.5	High	0.32		
	58-65	---	---	---	---	---	---	---		
Sherless	0-7	5-18	1.30-1.60	2.0-6.0	0.08-0.12	5.1-6.0	Low	0.20	3	.5-2
	7-27	20-35	1.45-1.70	0.6-2.0	0.09-0.18	4.5-5.5	Low	0.28		
	27-40	---	---	---	---	---	---	---		
Clebit	0-4	10-20	1.30-1.60	2.0-6.0	0.05-0.10	5.1-6.0	Low	0.15	1	.5-2
	4-16	10-20	1.30-1.60	2.0-6.0	0.04-0.10	4.5-5.5	Low	0.15		
	16-18	---	---	---	---	---	---	---		
CNF*:										
Carnasaw	0-11	15-26	1.30-1.60	0.6-2.0	0.10-0.16	5.1-6.0	Low	0.32	4	.5-2
	11-27	35-45	1.45-1.70	0.2-0.6	0.10-0.19	4.5-5.5	High	0.32		
	27-40	40-65	1.35-1.60	0.06-0.2	0.10-0.15	4.5-5.5	High	0.32		
	40-58	40-65	1.35-1.60	0.06-0.2	0.08-0.12	4.5-5.5	High	0.32		
	58-65	---	---	---	---	---	---	---		
Sherless	0-3	5-18	1.30-1.60	2.0-6.0	0.08-0.10	5.1-6.0	Low	0.20	3	.5-2
	3-7	5-18	1.35-1.60	2.0-6.0	0.08-0.12	4.5-6.0	Low	0.20		
	7-27	20-35	1.35-1.60	0.6-2.0	0.13-0.18	4.5-5.5	Low	0.28		
	27-40	---	---	---	---	---	---	---		
Clebit	0-4	10-20	1.30-1.60	2.0-6.0	0.05-0.10	5.1-6.0	Low	0.15	1	.5-2
	4-16	10-20	1.30-1.60	2.0-6.0	0.04-0.10	4.5-5.5	Low	0.15		
	16-18	---	---	---	---	---	---	---		
Cr	0-7	10-18	1.30-1.55	6.0-20	0.06-0.13	5.6-6.5	Low	0.24	5	.5-2
Ceda	7-72	15-32	1.40-1.70	6.0-20	0.06-0.13	5.6-6.5	Low	0.28		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cc	In/hr	In/in	pH				Pct
CSG*:										
Clebit	0-4	10-20	1.30-1.60	2.0-6.0	0.05-0.10	5.1-6.0	Low	0.15	1	.5-2
	4-16	10-20	1.30-1.60	2.0-6.0	0.04-0.10	4.5-5.5	Low	0.15		
	16-18	---	---	---	---	---	---	---		
Sherless	0-3	5-18	1.30-1.60	2.0-6.0	0.08-0.10	5.1-6.0	Low	0.20	3	.5-2
	3-7	5-18	1.35-1.60	2.0-6.0	0.08-0.12	5.1-6.0	Low	0.20		
	7-27	20-35	1.35-1.60	0.6-2.0	0.13-0.18	4.5-5.5	Low	0.28		
	27-40	---	---	---	---	---	---	---		
Carnasaw	0-4	10-26	1.30-1.60	0.6-2.0	0.06-0.12	5.1-6.0	Low	0.32	4	.5-2
	4-11	10-26	1.30-1.60	0.6-2.0	0.08-0.18	5.1-6.0	Low	0.32		
	11-27	35-45	1.45-1.70	0.2-0.6	0.10-0.19	4.5-5.5	High	0.32		
	27-40	40-65	1.35-1.60	0.06-0.2	0.10-0.15	4.5-5.5	High	0.32		
	40-58	40-65	1.35-1.60	0.06-0.2	0.08-0.12	4.5-5.5	High	0.32		
	58-65	---	---	---	---	---	---	---		
Cu	0-8	15-26	1.30-1.50	0.6-2.0	0.16-0.24	5.1-6.5	Low	0.37	5	.5-2
Cupco	8-61	27-35	1.45-1.60	0.2-0.6	0.18-0.22	4.5-6.0	Moderate	0.32		
	61-80	27-35	1.45-1.60	0.2-0.6	0.15-0.22	5.1-6.0	Moderate	0.32		
EdC, EdE	0-4	10-25	1.25-1.50	0.6-2.0	0.07-0.10	4.5-5.5	Low	0.32	4	.5-2
Enders	4-9	10-25	1.25-1.50	0.6-2.0	0.07-0.18	4.5-5.5	Low	0.32		
	9-45	35-60	1.15-1.45	0.01-0.06	0.12-0.18	4.5-5.5	High	0.32		
	45-57	40-60	1.20-1.45	0.01-0.06	0.08-0.17	4.5-5.5	High	0.32		
	57-65	---	---	---	---	---	---	---		
EdF	0-4	10-25	1.25-1.50	0.6-2.0	0.07-0.10	4.5-5.5	Low	0.32	4	.5-2
Enders	4-9	10-25	1.25-1.50	0.6-2.0	0.07-0.10	4.5-5.5	Low	0.32		
	9-45	35-60	1.15-1.45	0.01-0.06	0.12-0.18	4.5-5.5	High	0.32		
	45-57	40-60	1.20-1.45	0.01-0.06	0.08-0.17	4.5-5.5	High	0.32		
	57-66	---	---	---	---	---	---	---		
EME*, EMF*, EMG*:										
Enders	0-4	10-25	1.25-1.50	0.6-2.0	0.07-0.10	4.5-5.5	Low	0.32	4	.5-2
	4-9	10-25	1.25-1.50	0.6-2.0	0.07-0.10	4.5-5.5	Low	0.32		
	9-45	35-60	1.15-1.45	0.01-0.06	0.12-0.18	4.5-5.5	High	0.32		
	45-57	40-60	1.20-1.45	0.01-0.06	0.08-0.17	4.5-5.5	High	0.32		
	57-66	---	---	---	---	---	---	---		
Mountainburg	0-4	5-18	1.30-1.55	2.0-6.0	0.05-0.10	4.5-6.0	Low	0.17	1	.5-2
	4-9	5-18	1.30-1.50	2.0-6.0	0.05-0.10	4.5-6.0	Low	0.15		
	9-16	10-30	1.30-1.55	2.0-6.0	0.05-0.10	4.5-5.5	Low	0.24		
	16-20	---	---	---	---	---	---	---		
EwC	0-4	10-25	1.30-1.55	0.6-2.0	0.15-0.20	5.1-6.0	Low	0.32	4	.5-2
Endsaw	4-51	40-60	1.35-1.60	0.06-0.2	0.08-0.18	4.5-5.5	High	0.32		
	51-72	---	---	---	---	---	---	---		
EwE, EwF	0-4	10-25	1.30-1.55	0.6-2.0	0.08-0.20	5.1-6.0	Low	0.28	4	.5-2
Endsaw	4-51	40-60	1.35-1.60	0.06-0.2	0.08-0.18	4.5-5.5	High	0.32		
	51-72	---	---	---	---	---	---	---		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cc	In/hr	In/in	pH				Pct
Ka	0-9	10-20	1.30-1.60	0.6-2.0	0.06-0.11	5.1-6.5	Low	0.20	5	.5-2
Kenn	9-27	20-30	1.45-1.70	0.6-2.0	0.06-0.18	4.5-5.5	Moderate	0.28		
	27-42	20-30	1.45-1.70	0.6-2.0	0.02-0.10	4.5-5.5	Moderate	0.28		
	42-72	10-25	1.40-1.70	0.6-6.0	0.02-0.05	4.5-5.5	Low	0.28		
KC*:										
Kenn	0-9	10-20	1.30-1.60	0.6-2.0	0.06-0.11	5.1-6.5	Low	0.20	5	.5-2
	9-27	20-30	1.45-1.70	0.6-2.0	0.06-0.18	4.5-5.5	Moderate	0.28		
	27-42	20-30	1.45-1.70	0.6-2.0	0.02-0.10	4.5-5.5	Moderate	0.28		
	42-72	10-25	1.40-1.70	0.6-6.0	0.02-0.05	4.5-5.5	Low	0.28		
Ceda	0-7	10-18	1.30-1.55	6.0-20	0.06-0.13	5.6-6.5	Low	0.24	5	.5-2
	7-72	15-32	1.40-1.70	6.0-20	0.06-0.13	5.6-6.5	Low	0.28		
LMC*:										
Linker	0-6	5-20	1.30-1.60	0.6-2.0	0.08-0.14	4.5-5.5	Low	0.24	2	.5-2
	6-13	10-25	1.30-1.60	0.6-2.0	0.08-0.18	4.5-5.5	Low	0.28		
	13-28	18-35	1.30-1.60	0.6-2.0	0.11-0.18	4.5-5.5	Low	0.28		
	28-36	---	---	---	---	---				
Mountainburg	0-4	5-18	1.30-1.55	2.0-6.0	0.05-0.10	4.5-6.0	Low	0.17	1	.5-2
	4-9	5-18	1.30-1.50	2.0-6.0	0.05-0.10	4.5-6.0	Low	0.15		
	9-16	10-30	1.30-1.55	2.0-6.0	0.05-0.10	4.5-5.5	Low	0.24		
	16-20	---	---	---	---	---				
LvB, LvC	0-8	12-22	1.30-1.40	0.6-2.0	0.17-0.22	4.5-5.5	Low	0.43	4	.5-2
Leadvale	8-25	20-32	1.30-1.50	0.6-2.0	0.17-0.20	4.5-5.5	Low	0.43		
	25-65	20-35	1.55-1.70	0.06-0.6	0.06-0.11	4.5-5.5	Low	0.43		
	65-72	30-45	1.40-1.60	0.06-0.6	0.06-0.11	4.5-5.5	Low	0.24		
Na	0-13	15-26	1.30-1.55	0.6-2.0	0.15-0.24	4.5-6.0	Low	0.43	5	.1-3
Neff	13-59	25-35	1.40-1.70	0.2-0.6	0.16-0.24	4.5-6.0	Moderate	0.32		
	59-72	18-35	1.40-1.70	0.2-0.6	0.16-0.24	4.5-6.0	Moderate	0.32		
NeC	0-8	12-25	1.30-1.45	2.0-6.0	0.08-0.15	4.5-5.5	Low	0.20	5	.5-2
Nella	8-52	22-35	1.35-1.55	0.6-2.0	0.08-0.15	4.5-5.5	Low	0.24		
	52-72	27-45	1.30-1.45	0.6-2.0	0.07-0.14	4.5-5.5	Low	0.24		
NEE*:										
Nella	0-8	12-25	1.30-1.45	2.0-6.0	0.08-0.15	4.5-5.5	Low	0.20	5	.5-2
	8-52	22-35	1.35-1.55	0.6-2.0	0.08-0.15	4.5-5.5	Low	0.24		
	52-72	27-45	1.30-1.45	0.6-2.0	0.07-0.14	4.5-5.5	Low	0.24		
Enders	0-4	10-25	1.25-1.60	0.6-2.0	0.06-0.18	4.5-5.5	Low	0.32	4	.5-2
	4-9	10-25	1.25-1.60	0.6-2.0	0.06-0.18	4.5-5.5	Low	0.32		
	9-45	35-60	1.25-1.45	<0.06	0.12-0.18	4.5-5.5	High	0.32		
	45-57	40-60	1.25-1.45	<0.06	0.10-0.17	4.5-5.5	High	0.32		
	57-66	---	---	---	---	---				
NEF*:										
Nella	0-8	12-25	1.30-1.45	2.0-6.0	0.08-0.15	4.5-5.5	Low	0.24	5	.5-2
	8-52	22-35	1.35-1.55	0.6-2.0	0.07-0.14	4.5-5.5	Low	0.24		
	52-72	27-45	1.35-1.55	0.6-2.0	0.08-0.15	4.5-5.5	Low	0.24		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cc	In/hr	In/in	pH				Pct
NEF*:										
Enders	0-4	10-25	1.25-1.50	0.6-2.0	0.07-0.10	4.5-5.5	Low	0.32	4	.5-2
	4-9	10-25	1.25-1.50	0.6-2.0	0.07-0.10	4.5-5.5	Low	0.32		
	9-45	35-60	1.15-1.45	0.01-0.06	0.12-0.18	4.5-5.5	High	0.32		
	45-57	40-60	1.20-1.45	0.01-0.06	0.08-0.17	4.5-5.5	High	0.32		
	57-66	---	---	---	---	---	---	---		
OCG*:										
Octavia	0-4	10-25	1.30-1.55	0.6-2.0	0.06-0.11	5.1-6.0	Low	0.24	5	.5-2
	4-8	10-25	1.30-1.60	0.6-2.0	0.07-0.14	5.1-6.0	Low	0.24		
	8-13	10-25	1.35-1.60	0.6-2.0	0.08-0.16	4.5-5.5	Low	0.28		
	13-41	20-35	1.40-1.60	0.6-2.0	0.12-0.18	4.5-5.5	Low	0.28		
	41-72	35-60	1.35-1.60	0.2-0.6	0.12-0.19	4.5-5.5	Moderate	0.28		
Carnasaw	0-4	10-26	1.30-1.60	0.6-2.0	0.06-0.12	5.1-6.0	Low	0.28	4	.5-2
	4-11	10-26	1.30-1.60	0.6-2.0	0.08-0.18	5.1-6.0	Low	0.28		
	11-27	35-45	1.45-1.70	0.2-0.6	0.10-0.19	4.5-5.5	High	0.32		
	27-40	40-65	1.35-1.60	0.06-0.2	0.10-0.15	4.5-5.5	High	0.32		
	40-58	40-65	1.35-1.60	0.06-0.2	0.08-0.12	4.5-5.5	High	0.32		
	58-65	---	---	---	---	---	---	---		
Caston	0-4	10-20	1.30-1.60	0.6-2.0	0.06-0.12	5.1-6.0	Low	0.17	5	.5-2
	4-9	10-20	1.30-1.55	0.6-2.0	0.06-0.13	5.1-6.0	Low	0.15		
	9-21	15-20	1.40-1.60	0.6-2.0	0.05-0.13	4.5-5.5	Low	0.15		
	21-72	20-35	1.45-1.60	0.6-2.0	0.08-0.12	4.5-5.5	Low	0.24		
Rx	0-7	15-26	1.30-1.55	0.6-2.0	0.15-0.20	5.1-6.5	Low	0.37	5	1-3
Rexor	7-49	18-35	1.35-1.65	0.6-2.0	0.15-0.24	4.5-6.0	Moderate	0.37		
	49-72	18-27	1.40-1.65	0.6-2.0	0.15-0.24	4.5-6.0	Low	0.37		
SaB, SaC	0-5	12-20	1.30-1.60	0.6-2.0	0.10-0.20	5.1-6.5	Low	0.37	4	.5-2
Sallisaw	5-49	15-35	1.40-1.70	0.6-2.0	0.11-0.18	4.5-6.0	Low	0.32		
	49-72	22-35	1.40-1.70	0.6-2.0	0.06-0.10	4.5-6.0	Low	0.28		
Sp	0-8	5-20	1.35-1.60	2.0-6.0	0.11-0.15	4.5-6.0	Low	0.28	5	1-3
Spadra	8-38	10-35	1.30-1.60	0.6-2.0	0.12-0.20	4.5-6.0	Low	0.32		
	38-72	5-25	1.30-1.60	0.6-2.0	0.10-0.15	4.5-6.0	Low	0.24		
Ta, Tf	0-7	10-25	1.30-1.40	0.6-2.0	0.20-0.22	4.5-5.5	Low	0.43	4	.5-2
Taft	7-24	18-35	1.30-1.50	0.6-2.0	0.18-0.20	4.5-5.5	Low	0.43		
	24-58	15-35	1.50-1.65	0.06-0.2	0.03-0.07	4.5-5.5	Low	0.43		
	58-72	27-45	1.35-1.60	0.2-0.6	0.01-0.03	4.5-5.5	Low	0.37		
Ud	0-60	---	---	---	---	---	---	---	---	---
Udorthents										
WbC	0-7	10-25	1.30-1.60	2.0-6.0	0.06-0.11	5.1-6.0	Low	0.28	4	.5-2
Wilburton	7-15	10-30	1.40-1.65	0.6-2.0	0.06-0.16	5.1-6.0	Low	0.28		
	15-38	20-30	1.40-1.65	0.6-2.0	0.05-0.11	4.5-5.5	Low	0.28		
	38-72	20-30	1.40-1.65	0.6-2.0	0.05-0.11	4.5-6.0	Low	0.28		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
AvB, AvC---------- Avilla	B	None--------	---	---	>6.0	---	---	>60	---	Low------	Moderate.
CaC---------- Cane	C	None--------	---	---	1.5-2.5	Perched	Dec-May	>60	---	Moderate	High.
CbD---------- Carnasaw	C	None--------	---	---	>6.0	---	---	40-60	Soft	High-----	High.
CCF*:											
Carnasaw---------	C	None--------	---	---	>6.0	---	---	40-60	Soft	High-----	High.
Octavia----------	B	None--------	---	---	4.0-5.0	Perched	Dec-May	>60	---	Moderate	High.
CDC*, CDE*, CDF*:											
Carnasaw---------	C	None--------	---	---	>6.0	---	---	40-60	Soft	High-----	High.
Sherless---------	B	None--------	---	---	>6.0	---	---	20-40	Soft	Moderate	Moderate.
CNC*, CNE*, CNF*:											
Carnasaw---------	C	None--------	---	---	>6.0	---	---	40-60	Soft	High-----	High.
Sherless---------	B	None--------	---	---	>6.0	---	---	20-40	Soft	Moderate	Moderate.
Clebit-----------	D	None--------	---	---	>6.0	---	---	10-20	Hard	Low------	Moderate.
Cr---------- Ceda	B	Frequent----	Very brief	Dec-May	>6.0	---	---	>60	---	Low------	Moderate.
CSG*:											
Clebit-----------	D	None--------	---	---	>6.0	---	---	10-20	Hard	Low------	Moderate.
Sherless---------	B	None--------	---	---	>6.0	---	---	20-40	Soft	Moderate	Moderate.
Carnasaw---------	C	None--------	---	---	>6.0	---	---	40-60	Soft	High-----	High.
Cu---------- Cupco	C	Occasional	Very brief to brief.	Dec-May	0.5-2.0	Perched	Dec-May	>60	---	High-----	Moderate.
EdC, EdE, EdF----- Enders	C	None--------	---	---	>6.0	---	---	40-60	Soft	High-----	High.
EME*, EMF*, EMG*:											
Enders-----------	C	None--------	---	---	>6.0	---	---	40-60	Soft	High-----	High.
EME*, EMF*, EMG*:											
Mountainburg-----	D	None--------	---	---	>6.0	---	---	12-20	Hard	Low------	Moderate.
EwC, EwE, EwF----- Endsaw	C	None--------	---	---	>6.0	---	---	40-60	Soft	High-----	High.
Ka---------- Kenn	B	Occasional	Very brief	Dec-May	>6.0	---	---	>60	---	Moderate	Moderate.

See footnote at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
KC*:											
Kenn	B	Frequent	Very brief	Dec-May	>6.0	---	---	>60	---	Moderate	Moderate.
Ceda	B	Frequent	Very brief	Dec-May	>6.0	---	---	>60	---	Low	Moderate.
LMC*:											
Linker	B	None	---	---	>6.0	---	---	20-40	Hard	Low	High.
Mountainburg	D	None	---	---	>6.0	---	---	12-20	Hard	Low	Moderate.
LvB, LvC Leadvale	C	None	---	---	1.5-2.5	Perched	Dec-May	>48	Soft	Moderate	Moderate.
Na Neff	C	Occasional	Very brief to brief.	Dec-May	1.0-2.5	Apparent	Dec-May	>60	---	High	Moderate.
NeC Nella	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
NEE*:											
Nella	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
Enders	C	None	---	---	>6.0	---	---	40-60	Soft	High	High.
NEF*:											
Nella	B	None	---	---	>6.0	---	---	>60	---	Low	Moderate.
Enders	C	None	---	---	>6.0	---	---	40-60	Soft	High	High.
OCG*:											
Octavia	B	None	---	---	4.0-5.0	Perched	Dec-May	>60	---	Moderate	High.
Carnasaw	C	None	---	---	>6.0	---	---	40-60	Soft	High	High.
Caston	B	None	---	---	>6.0	---	---	>60	---	Moderate	High.
Rx Rexor	B	Frequent	Very brief	Dec-May	4.0-5.0	Apparent	Dec-May	>60	---	Moderate	Moderate.
SaB, SaC Sallisaw	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
Sp Spadra	B	Occasional	Very brief to brief.	Dec-May	>6.0	---	---	>60	---	Low	High.
Ta, Tf Taft	C	None	---	---	1.0-2.0	Perched	Dec-May	>60	---	High	High.
Ud Udorthents	---	None	---	---	>6.0	---	---	>60	---	High	High.
WbC Wilburton	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--WASTE MANAGEMENT GUIDE

Map unit name	Land Application of Manure
Avilla silt loam, 1 to 3 percent slopes	Moderate: too acid.
Avilla silt loam, 3 to 8 percent slopes	Moderate: too acid.
Cane fine sandy loam, 3 to 8 percent slopes	Severe: percs slowly; wetness.
Carnasaw stony silt loam, 3 to 15 percent slopes	Severe: percs slowly.
Carnasaw-Octavia complex, 15 to 35 percent slopes:	
Carnasaw	Severe: percs slowly; slope; too stony.
Octavia	Severe: slope; too stony.
Carnasaw-Sherless complex, 3 to 8 percent slopes:	
Carnasaw	Severe: percs slowly.
Sherless	Moderate: depth to rock; too acid.
Carnasaw-Sherless complex, 8 to 20 percent slopes:	
Carnasaw	Severe: percs slowly.
Sherless	Moderate: slope; depth to rock; too acid; too cobbly.
Carnasaw-Sherless complex, 20 to 35 percent slopes:	
Carnasaw	Severe: percs slowly; slope; too stony.
Sherless	Severe: slope; too stony
Carnasaw-Sherless-Clebit complex, 3 to 8 percent slopes:	
Carnasaw	Severe: percs slowly.
Sherless	Moderate: depth to rock; too acid.
Clebit	Severe: depth to rock; too stony.
Carnasaw-Sherless-Clebit complex, 8 to 20 percent slopes:	
Carnasaw	Severe: percs slowly.
Sherless	Moderate: slope; depth to rock; too acid; too cobbly.
Clebit	Severe: depth to rock; too stony.

TABLE 16.--WASTE MANAGEMENT GUIDE--Continued

Map unit name	Land Application of Manure
Carnasaw-Sherless-Clebit complex, 20 to 35 percent slopes:	
Carnasaw	Severe: percs slowly; slope; too stony.
Sherless	Severe: slope; too stony.
Clebit	Severe: slope; depth to rock; too stony.
Ceda very cobbly loam, frequently flooded	Severe: flooding; poor filter.
Clebit-Sherless-Carnasaw complex, 35 to 60 percent slopes:	
Clebit	Severe: slope; depth to rock; too stony.
Sherless	Severe: slope; too stony.
Carnasaw	Severe: percs slowly; slope; too stony.
Cupco silt loam, occasionally flooded	Severe: wetness; flooding.
Enders gravelly silt loam, 3 to 8 percent slopes	Severe: percs slowly.
Enders gravelly silt loam, 8 to 20 percent slopes	Severe: percs slowly.
Enders stony silt loam, 20 to 40 percent slopes	Severe: percs slowly; slope; too stony.
Enders-Mountainburg complex, 8 to 20 percent slopes:	
Enders	Severe: percs slowly; too stony.
Mountainburg	Severe: depth to rock; too stony.
Enders-Mountainburg complex, 20 to 40 percent slopes:	
Enders	Severe: percs slowly; slope; too stony.
Mountainburg	Severe: slope; depth to rock; too stony.
Enders-Mountainburg complex, 40 to 65 percent slopes:	
Enders	Severe: percs slowly; slope; too stony.
Mountainburg	Severe: slope; depth to rock; slope.
Endsaw gravelly loam, 3 to 8 percent slopes	Severe: percs slowly.
Endsaw cobbly loam, 8 to 20 percent slopes	Severe: percs slowly.

TABLE 16.--WASTE MANAGEMENT GUIDE--Continued

Map unit name	Land Application of Manure
Endsaw stony loam, 20 to 35 percent slopes	Severe: percs slowly; slope; too stony.
Kenn gravelly fine sandy loam, occasionally flooded	Severe: flooding.
Kenn-Ceda complex, frequently flooded:	
Kenn	Severe: flooding.
Ceda	Severe: flooding; poor filter.
Leadvale silt loam, 1 to 3 percent slopes	Severe: percs slowly; wetness.
Leadvale silt loam, 3 to 8 percent slopes	Severe: percs slowly; wetness.
Linker-Mountainburg complex, 3 to 8 percent slopes:	
Linker	Moderate: depth to rock.
Mountainburg	Severe: depth to rock; too stony.
Neff silt loam, occasionally flooded	Severe: wetness; flooding.
Nella gravelly fine sandy loam, 3 to 8 percent slopes	Moderate: too acid.
Nella-Enders complex, 8 to 20 percent slopes:	
Nella	Moderate: slope; too cobbly; too acid.
Enders	Severe: percs slowly.
Nella-Enders complex, 20 to 40 percent slopes:	
Nella	Severe: slope; too stony.
Enders	Severe: percs slowly; slope; too stony.
Octavia-Carnasaw-Caston complex, 35 to 60 percent slopes:	
Octavia	Severe: slope; too stony.
Carnasaw	Severe: percs slowly; slope; too stony.
Caston	Severe: slope; too stony.
Rexor loam, frequently flooded	Severe: flooding.
Sallisaw silt loam, 0 to 3 percent slopes	Moderate: too acid.

TABLE 16.--WASTE MANAGEMENT GUIDE--Continued

Map unit name	Land Application of Manure
Sallisaw silt loam, 3 to 8 percent slopes	Moderate: too acid.
Spadra fine sandy loam, occasionally flooded	Severe: flooding.
Taft silt loam, 0 to 2 percent slopes	Severe: percs slowly; wetness.
Taft silt loam, mounded	Severe: percs slowly; wetness
Udorthents, 3 to 65 percent slopes, channery	Severe: slope; too cobbly.
Wilburton very cobbly loam, 1 to 8 percent slopes	Severe: too cobbly.

TABLE 17.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Avilla	Fine-loamy, siliceous, thermic Typic Paleudults
Cane	Fine-loamy, siliceous, thermic Typic Fragiudults
Carnasaw	Clayey, mixed, thermic Typic Hapludults
Caston	Loamy-skeletal, siliceous, thermic Typic Paleudults
Ceda	Loamy-skeletal, siliceous, nonacid, thermic Typic Udifluvents
Clebit	Loamy-skeletal, siliceous, thermic Lithic Dystrochrepts
Cupco	Fine-silty, siliceous, thermic Typic Epiaqualfs
Enders	Clayey, mixed, thermic Typic Hapludults
Endsaw	Clayey, mixed, thermic Typic Hapludults
Kenn	Fine-loamy, siliceous, thermic Ultic Hapludalfs
Leadvale	Fine-silty, siliceous, thermic Typic Fragiudults
Linker	Fine-loamy, siliceous, thermic Typic Hapludults
Mountainburg	Loamy-skeletal, siliceous, thermic Lithic Hapludults
Neff	Fine-silty, siliceous, thermic Aquultic Hapludalfs
Nella	Fine-loamy, siliceous, thermic Typic Paleudults
Octavia	Fine-loamy, siliceous, thermic Typic Paleudults
Rexor	Fine-silty, siliceous, thermic Ultic Hapludalfs
Sallisaw	Fine-loamy, siliceous, thermic Typic Paleudalfs
Sherless	Fine-loamy, mixed, thermic Typic Hapludults
Spadra	Fine-loamy, siliceous, thermic Typic Hapludults
Taft	Fine-silty, siliceous, thermic Glossaquic Fragiudults
Udorthents	Mixed, thermic Typic Udorthents
Wilburton	Loamy-skeletal, siliceous, thermic Ultic Hapludalfs

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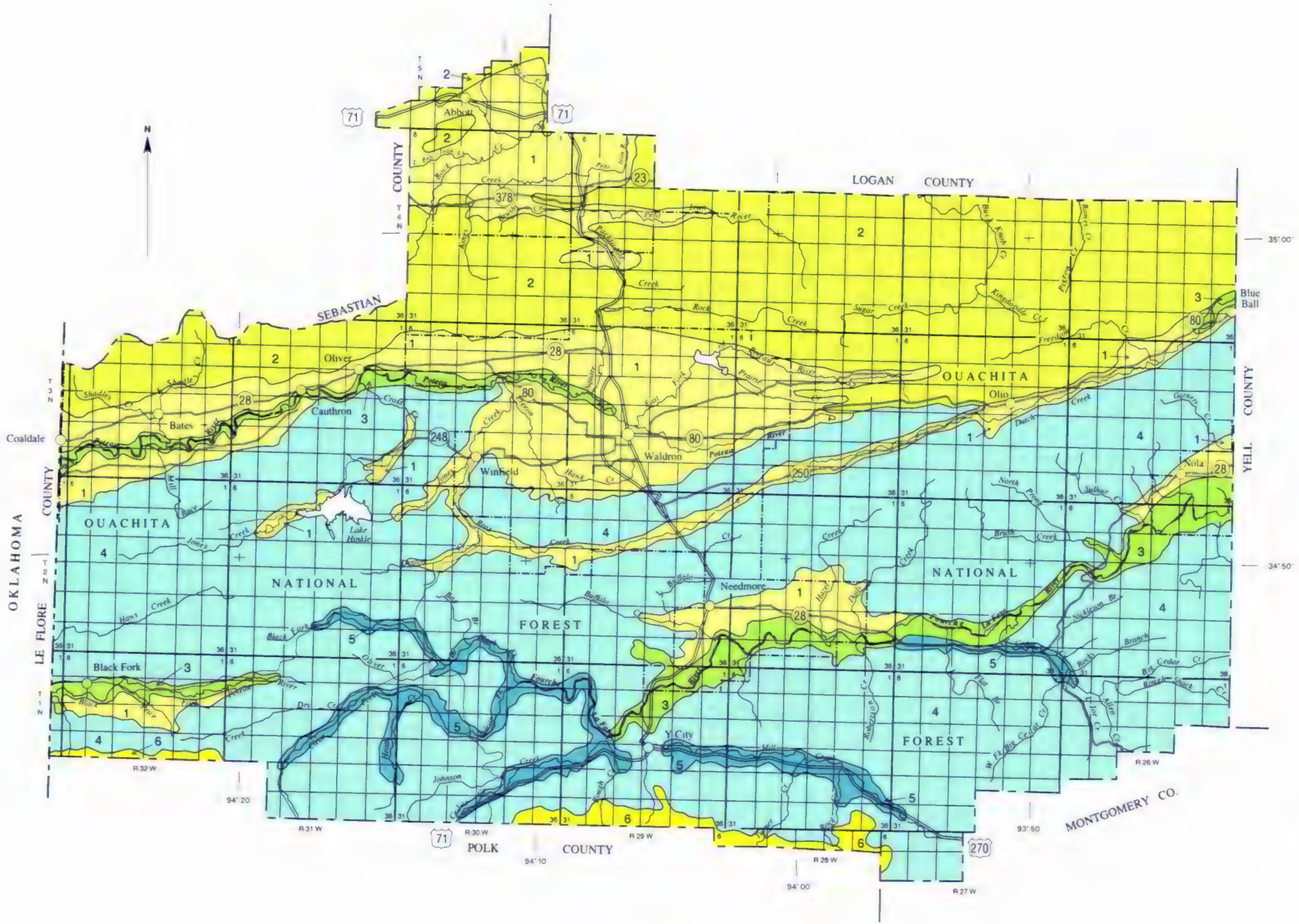


SOIL LEGEND*

1	Leadvale-Endsaw-Taft
2	Enders-Nella-Mountainburg
3	Spadra-Neff-Cupco
4	Carnasaw-Sherless-Clebit
5	Kenn-Avilla-Ceda
6	Octavia-Caston-Carnasaw

*The units on this legend are described under the heading "General Soil Map Units."

Compiled 1991

SECTIONALIZED TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
and
FOREST SERVICE
in cooperation with
ARKANSAS AGRICULTURAL EXPERIMENT STATION

GENERAL SOIL MAP

SCOTT COUNTY, ARKANSAS

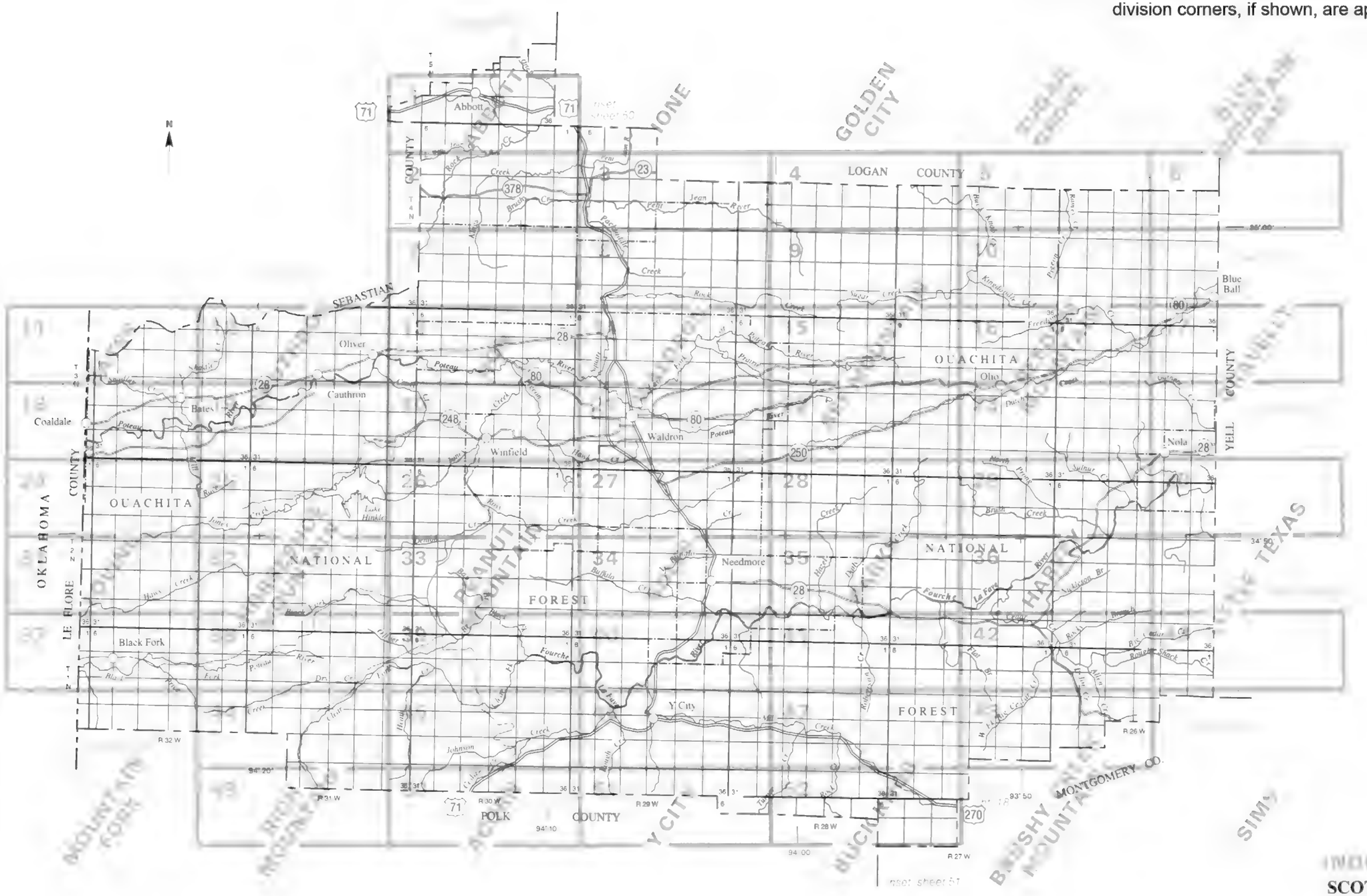
Scale 1 253440

1 0 1 2 3 MILES

1 0 1 2 3 4 5 6 KILOMETERS

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts

Original text from each individual map sheet read:
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1975 - 1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



SOIL LEGEND

Map symbols are alphabetical and consist of a combination of capital and lower case letters. The first letter always a capital, is the initial letter of the soil name. The second letter, if lower case, is a consociation map unit; or, if a capital, is a complex map unit. The third letter, always a capital, denotes the slope class. Symbols without a third letter denote soils that are level or nearly level and are occasionally or frequently flooded.

Soil names followed by the superscript 1/ are units that were designed primarily for woodland management. Fewer soil examinations were made in these units and included areas are generally larger.

SYMBOL	NAME
AvB	Avilla silt loam, 1 to 3 percent slopes
AvC	Avilla silt loam, 3 to 8 percent slopes
CaC	Cane fine sandy loam, 3 to 8 percent slopes
CbD	Carnasaw stony silt loam, 3 to 15 percent slopes
CCF	Carnasaw-Octavia complex, 15 to 35 percent slopes 1
CDC	Carnasaw-Sherless complex, 3 to 8 percent slopes 1
CDE	Carnasaw-Sherless complex, 8 to 20 percent slopes 1
CDF	Carnasaw-Sherless complex, 20 to 35 percent slopes 1
CNC	Carnasaw-Sherless-Clebit complex, 3 to 8 percent slopes 1
CNE	Carnasaw-Sherless-Clebit complex, 8 to 20 percent slopes 1
CNF	Carnasaw-Sherless-Clebit complex, 20 to 35 percent slopes 1
Cr	Ceda very cobbly loam, frequently flooded
CSG	Clebit-Sherless-Carnasaw complex, 35 to 60 percent slopes 1
Cu	Cupco silt loam, occasionally flooded
EdC	Enders gravelly silt loam, 3 to 8 percent slopes
EdE	Enders gravelly silt loam, 8 to 20 percent slopes
EdF	Enders stony silt loam, 20 to 40 percent slopes
EME	Enders-Mountainburg complex, 8 to 20 percent slopes 1
EMF	Enders-Mountainburg complex, 20 to 40 percent slopes 1
EMG	Enders-Mountainburg complex, 40 to 65 percent slopes 1
EwC	Endsaw gravelly loam, 3 to 8 percent slopes
EwE	Endsaw cobbly loam, 8 to 20 percent slopes
EwF	Endsaw stony loam, 20 to 35 percent slopes
Ka	Kenn gravelly fine sandy loam, occasionally flooded
KC	Kenn-Ceda complex, frequently flooded 1
LvB	Leadvale silt loam, 1 to 3 percent slopes
LvC	Leadvale silt loam, 3 to 8 percent slopes
LMC	Linker-Mountainburg complex, 3 to 8 percent slopes 1
Na	Neff silt loam, occasionally flooded
NeC	Nella gravelly fine sandy loam, 3 to 8 percent slopes
NEE	Nella-Enders complex, 8 to 20 percent slopes 1
NEF	Nella-Enders complex, 20 to 40 percent slopes 1
OCG	Octavia-Carnasaw-Caston complex, 35 to 60 percent slopes 1
Rx	Rexor loam, frequently flooded
SaB	Sallisaw silt loam, 0 to 3 percent slopes
SaC	Sallisaw silt loam, 3 to 8 percent slopes
Sp	Spadra fine sandy loam, occasionally flooded
Ta	Taft silt loam, 0 to 2 percent slopes
Tf	Taft silt loam, mounded
Ud	Udorthents, 3 to 65 percent slopes, channery
WbC	Wilburton very cobbly loam, 1 to 8 percent slopes

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES
- National, state, or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline and neatline
- AD HOC BOUNDARY (label)
- Small airport, airfield, park, oilfield cemetery, or flood pool
- STATE COORDINATE TICK 1 890 000 FEET
- LAND DIVISION CORNER (sections and land grants)

ROADS
- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEM & DESIGNATIONS
- Interstate (173)
- Federal (287)
- State (52)
- County, farm or ranch (1283)

RAILROAD

POWER TRANSMISSION LINE (normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES
- Without road
- With road
- With railroad

DAMS
- Large (to scale)
- Medium or Small (Named where applicable)

PITS
- Gravel pit
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES
- Farmstead, house (omit in urban area) (occupied)
- Church
- School
- Indian mound (label)
- Located object (label) (Tower)
- Tank (label) (Gas)
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE
- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
- Double-line (label) (ANA)
- Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS
- Perennial
- Intermittent

MISCELLANEOUS WATER FEATURES
- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS (KC, LvB)

ESCARPMENTS
- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

GULLY

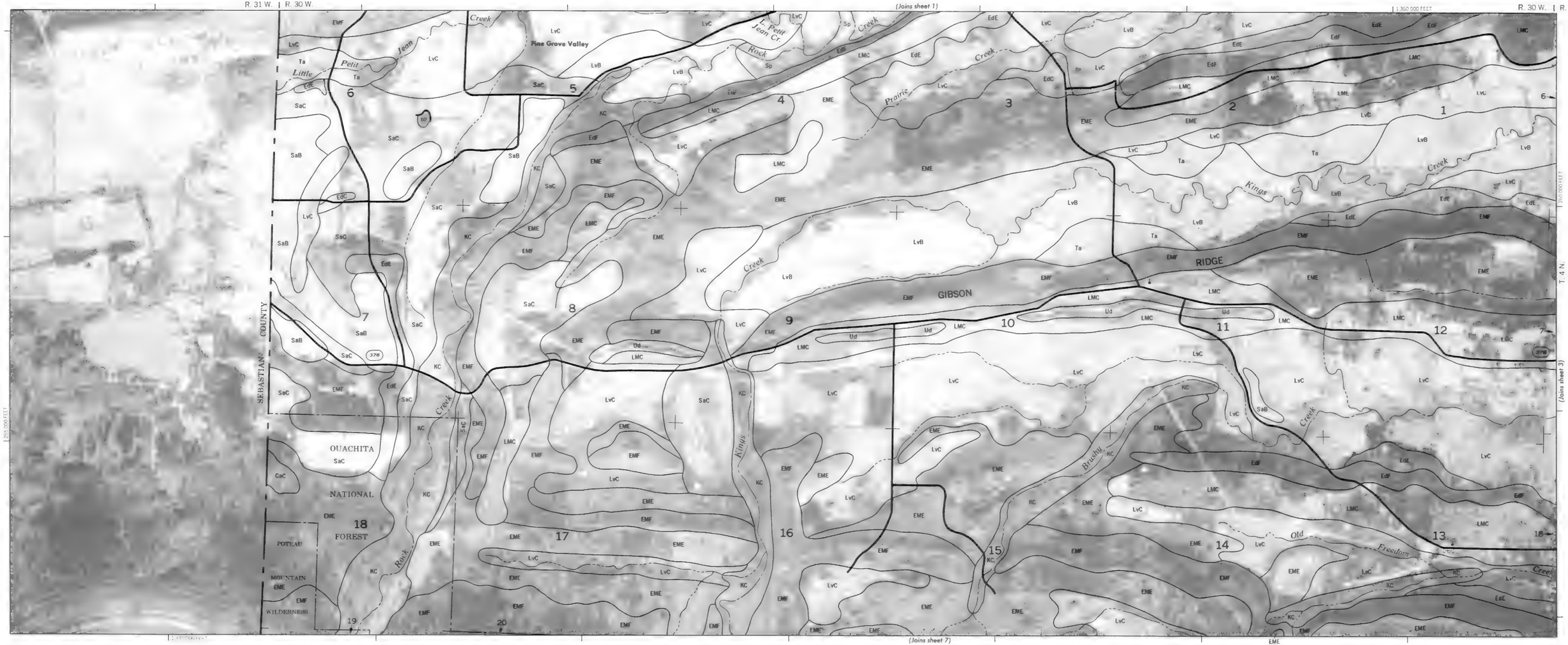
DEPRESSION OR SINK

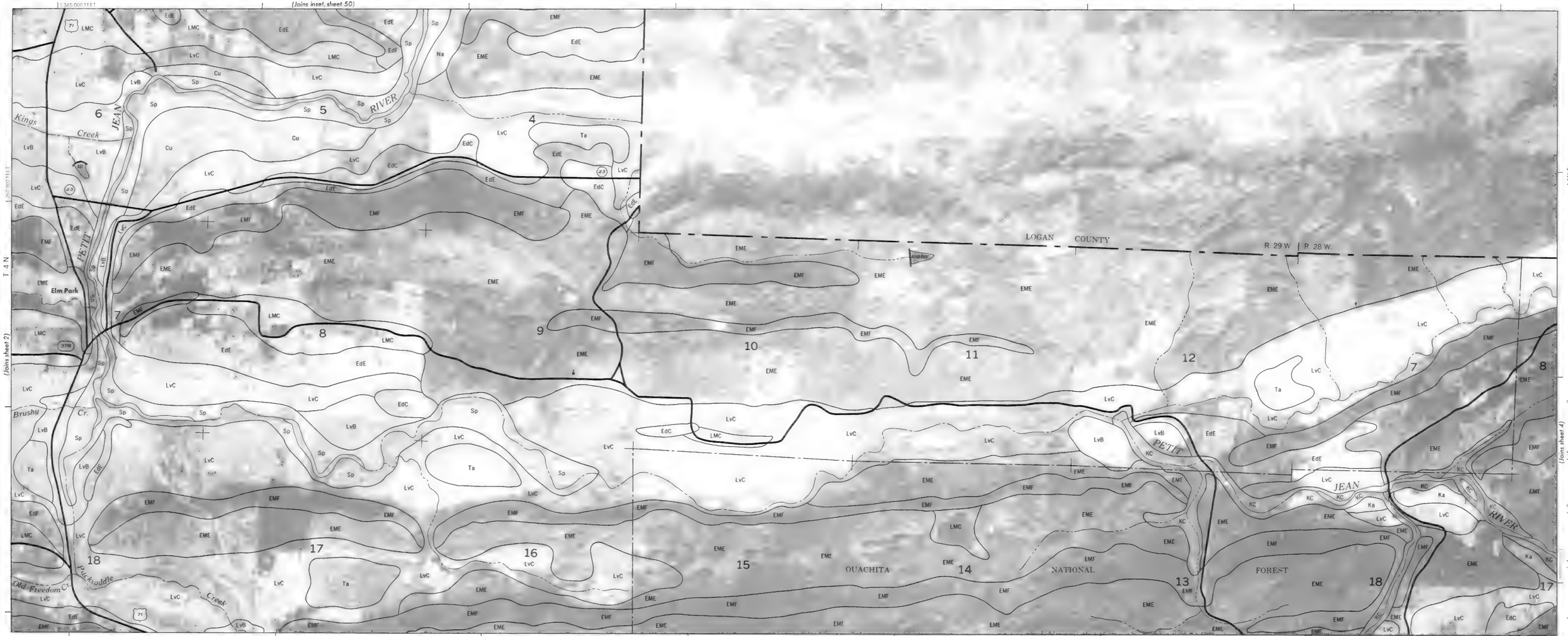
SOIL SAMPLE (normally not shown)

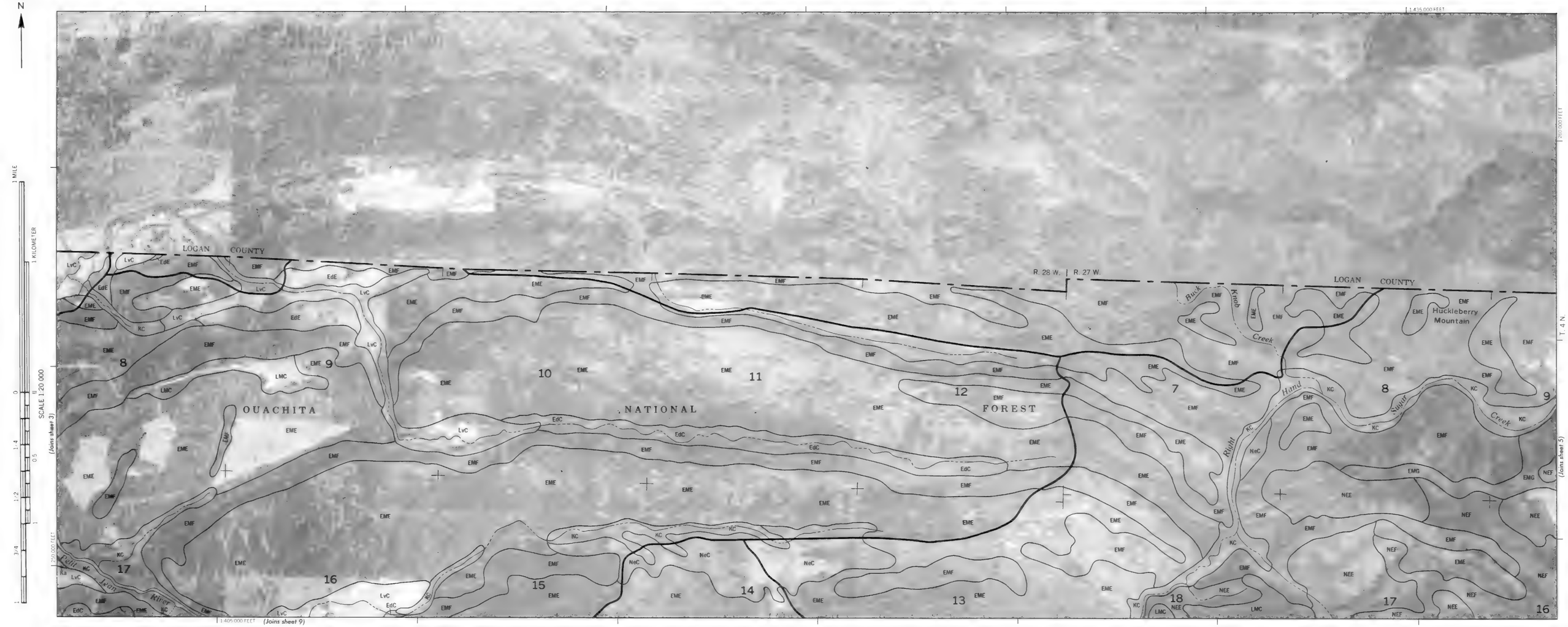
MISCELLANEOUS
- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps and other similar non soil areas
- Prominent hill or peak
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot

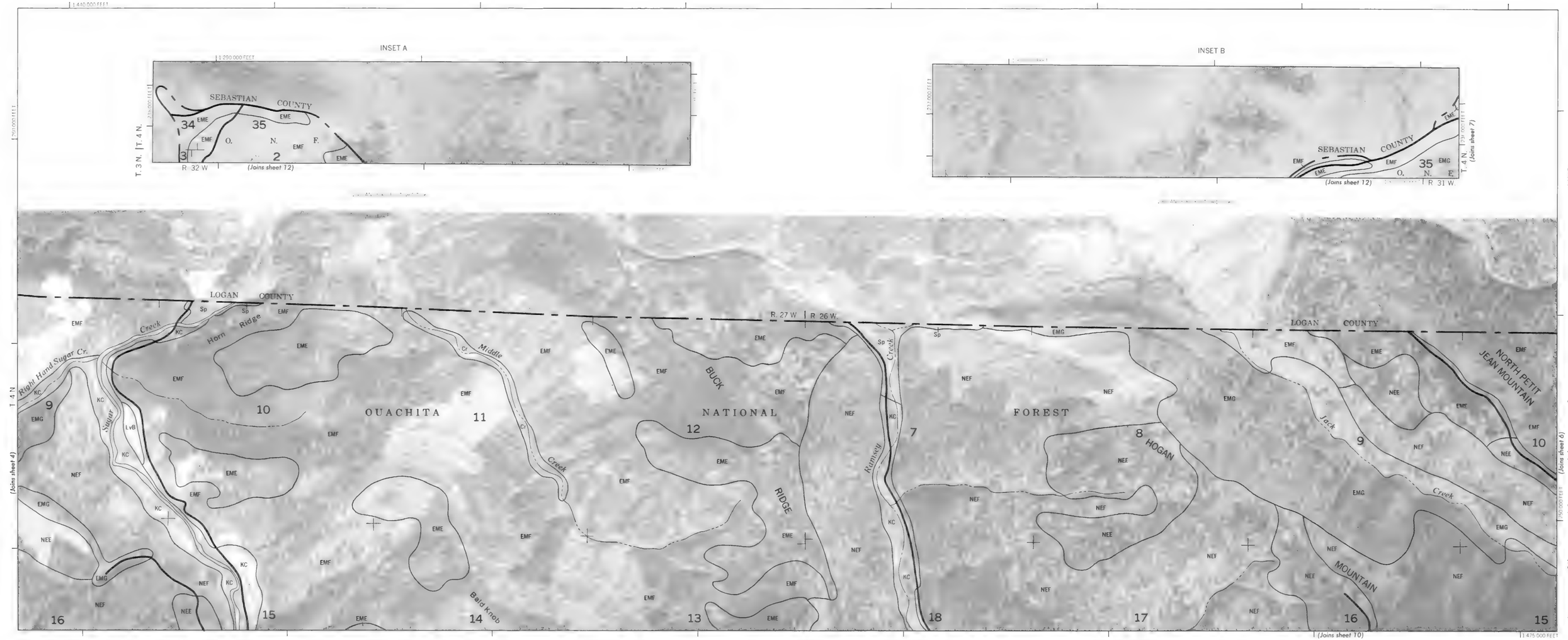
SOIL SURVEY OF SCOTT COUNTY, ARKANSAS - SHEET NUMBER 1

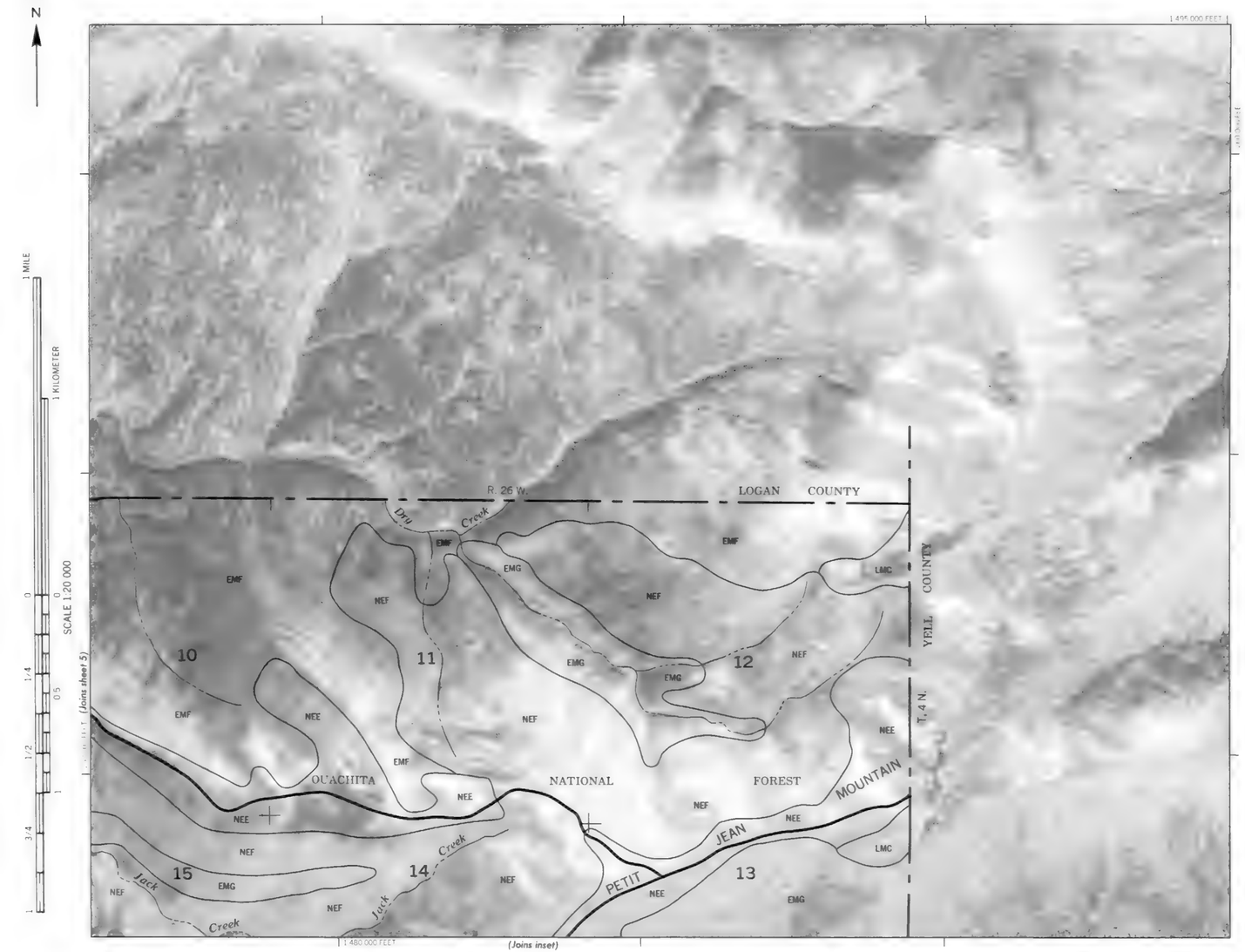
SOIL SURVEY OF SCOTT COUNTY, ARKANSAS - SHEET NUMBER 2

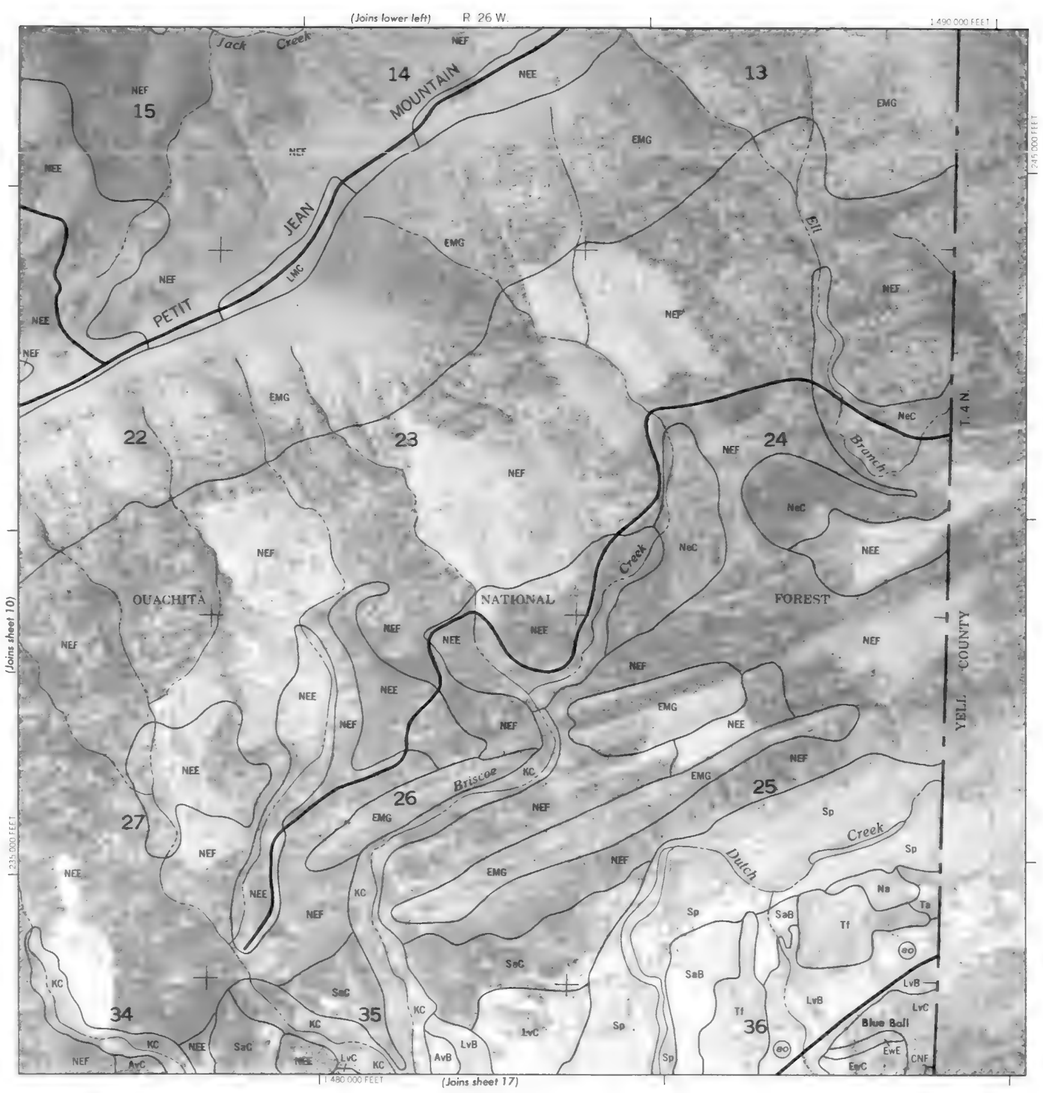



(Joins inset, sheet 50)
(Joins sheet 2)
(Joins sheet 4)
(Joins sheet 8)
T 4 N
LOGAN COUNTY
R 29 W
R 28 W.
OUACHITA NATIONAL FOREST
Elm Park
Kings Creek
JEAN
PETIT
RIVER
Brushy Cr.
Old Freedom Cr.
Buckaddle Creek
N
1 MILE
1 KILOMETER
SCALE 1:20 000

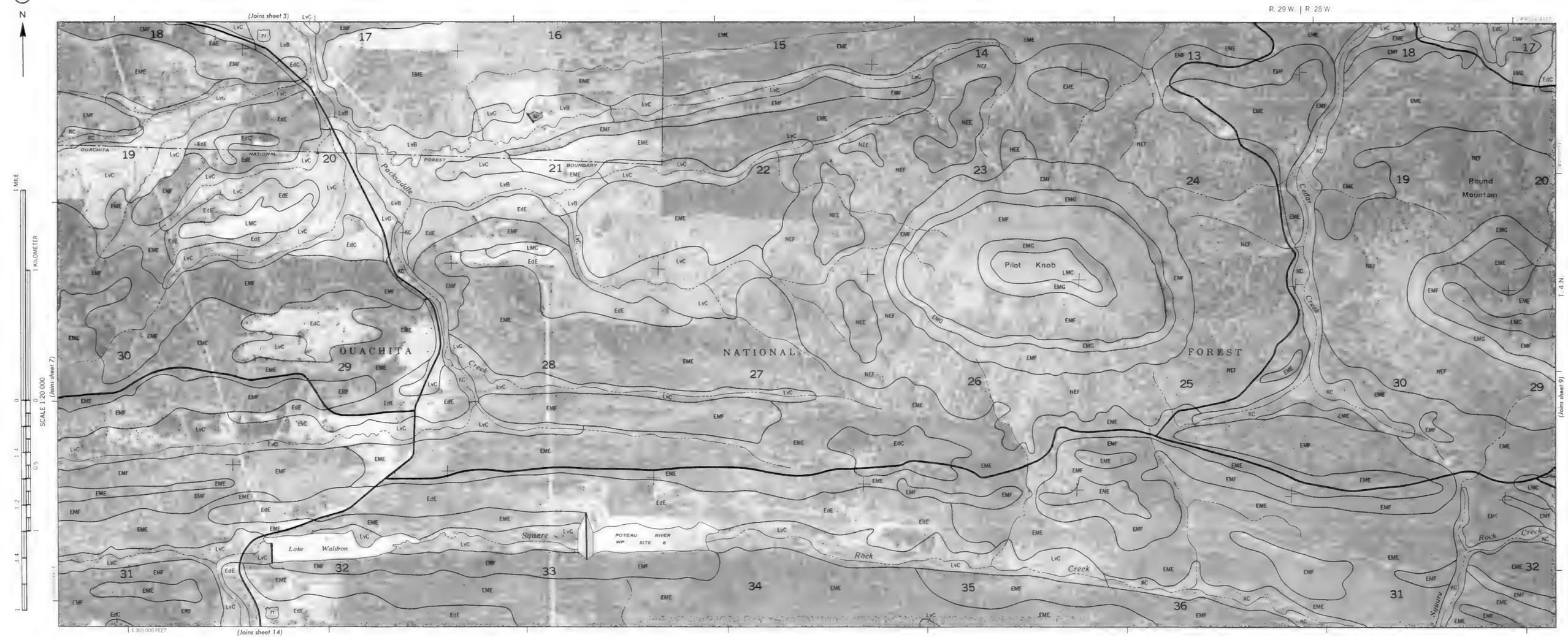

4
N
1 MILE
1 KILOMETER
SCALE 1:20 000
(Joins sheet 3)
(Joins sheet 5)
(Joins sheet 9)
1 435 000 FEET
1 405 000 FEET
260 000 FEET
T. 4 N.
R. 28 W.
R. 27 W.
LOGAN COUNTY
LOGAN COUNTY
OUACHITA NATIONAL FOREST
Huckleberry Mountain
Buck Knob Creek
Hand Sugar Creek
Right Fork Illinois Bayou
Illinois Bayou River
LvC
EdE
EdC
EME
EMF
KC
LMC
NeC
NEE
NEF
EMG
Ka
8
9
10
11
12
7
17
16
15
14
13
18

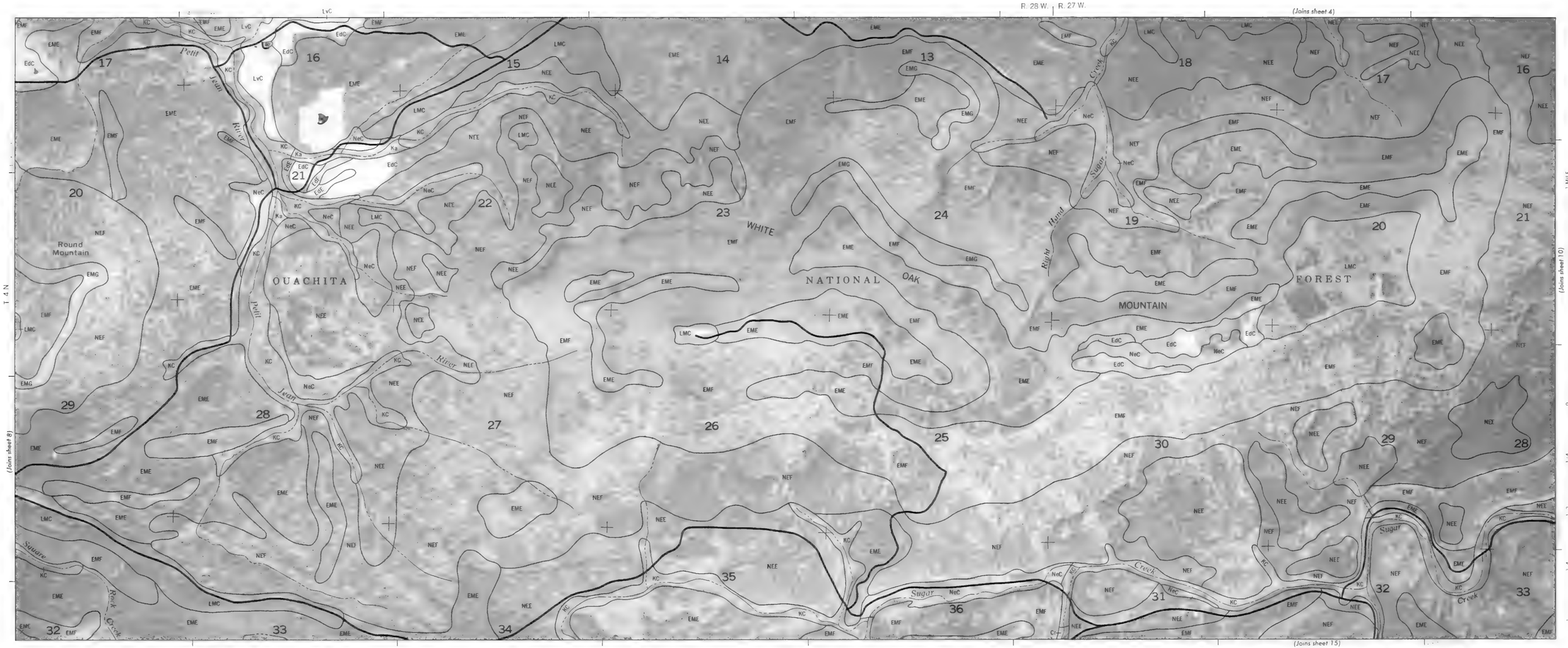

INSET A
INSET B
SEBASTIAN COUNTY
LOGAN COUNTY
OUACHITA NATIONAL FOREST
BUCK RIDGE
NORTH PETIT JEAN MOUNTAIN
MOUNTAIN
HOGAN
Horn Creek
Middle Creek
Ramsey Creek
Jack Creek
Right Hand Sugar Cr.
Sugar Creek
Bald Knob
R. 27 W
R. 26 W
R. 32 W
R. 31 W
T. 4 N.
T. 3 N.
(Joins sheet 4)
(Joins sheet 6)
(Joins sheet 7)
(Joins sheet 10)
(Joins sheet 12)
N
1 MILE
1 KILOMETER
SCALE 1:20 000

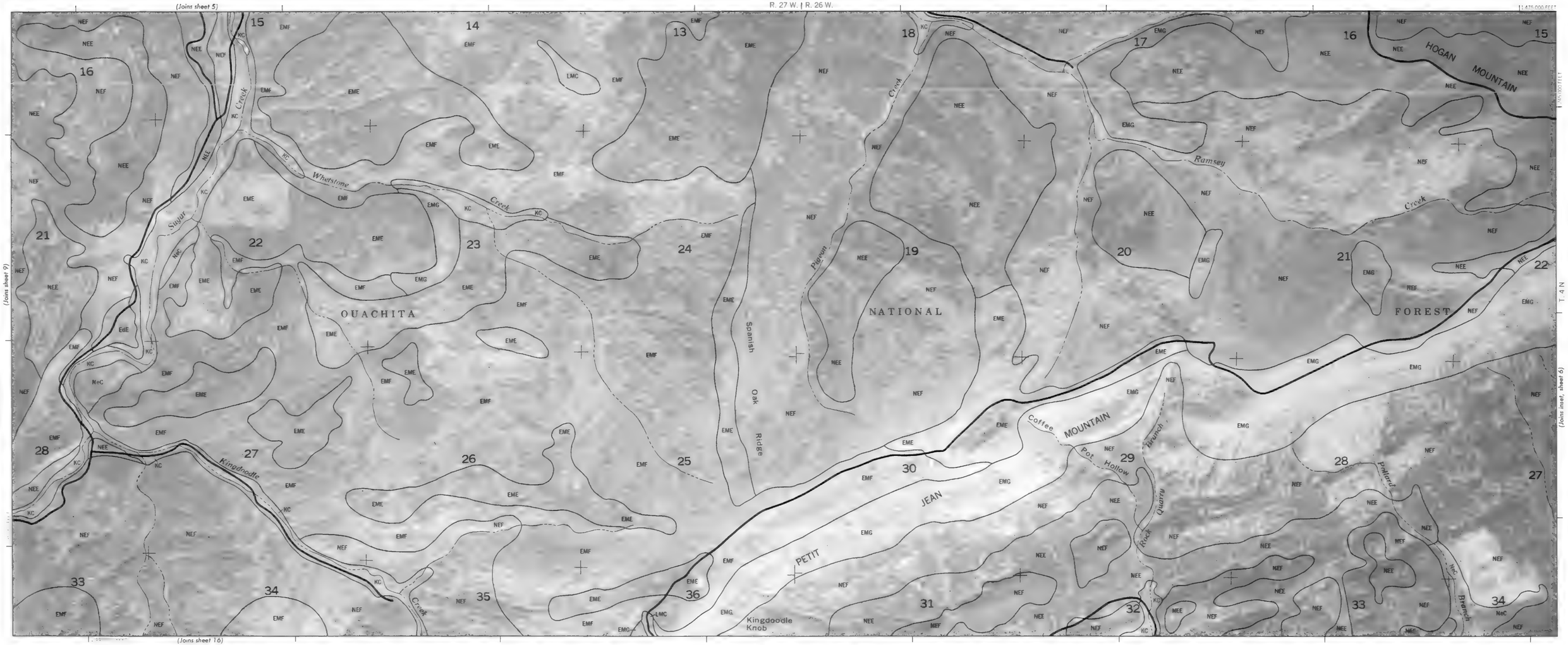

6
N
1 MILE
1 KILOMETER
SCALE 1:20 000
1 495 000 FEET
R. 26 W.
LOGAN COUNTY
YELL COUNTY
T. 4 N.
Dru Creek
Jack Creek
JEAN PETIT MOUNTAIN
OUACHITA NATIONAL FOREST
10
11
12
13
14
15
EMF
EMG
NEF
NEE
LMC
(Joins sheet 5)
1 480 000 FEET
(Joins inset)

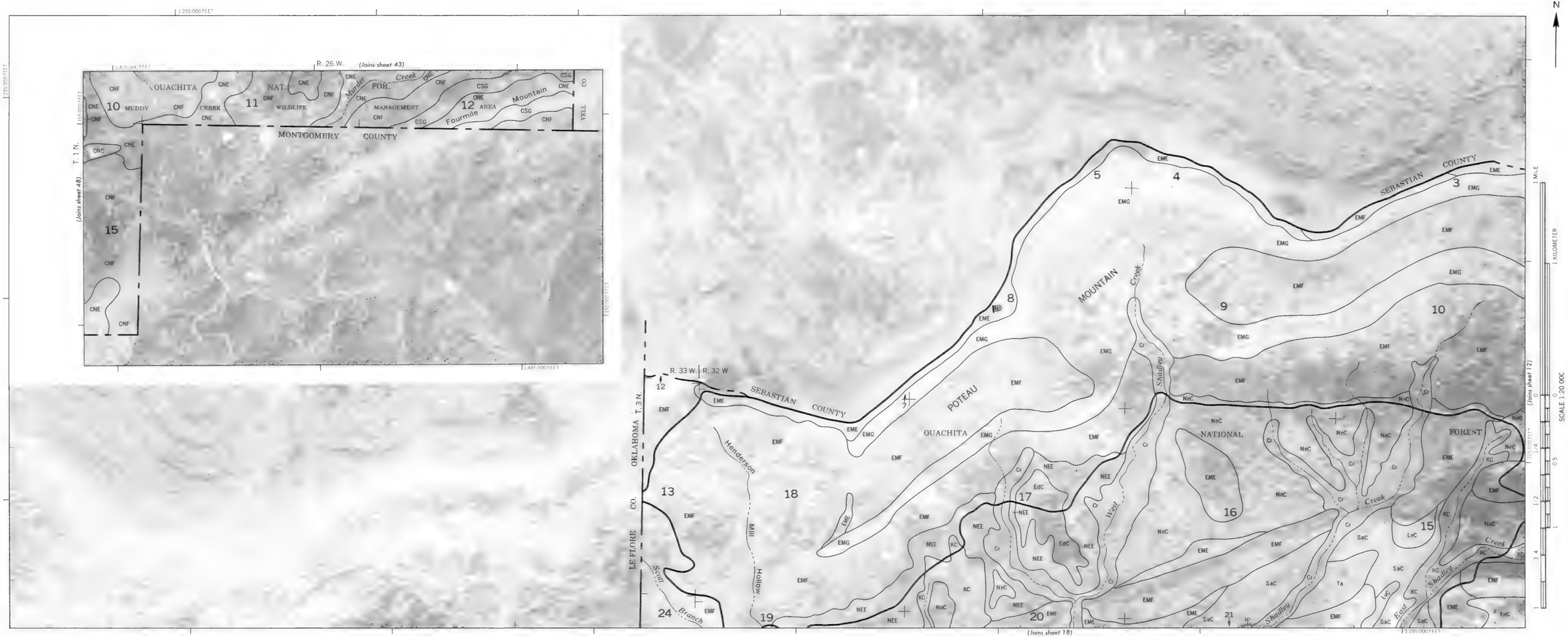

(Joins lower left)
R. 26 W.
1 490 000 FEET
Jack Creek
JEAN PETIT MOUNTAIN
Ell Branch
Briscoe Creek
Dutch Creek
OUACHITA NATIONAL FOREST
YELL COUNTY
T. 4 N.
13
14
15
22
23
24
25
26
27
34
35
36
EMG
NEF
NEE
NeC
LMC
KC
SaB
SaC
Sp
Tf
LvB
LvC
AvB
AvC
Blue Ball
(Joins sheet 10)
1 480 000 FEET
(Joins sheet 17)


R 31 W
R 30 W
R 30 W.
R 29 W.
(Joins sheet 2)
(Joins inset B, sheet 5)
(Joins sheet 8)
(Joins sheet 13)
N
SCALE 1:20 000
1 MILE
1 KILOMETER
SEBASTIAN COUNTY
T. 4 N.
POTEAU MOUNTAIN WILDERNESS
POTEAU MOUNTAIN WILDERNESS BOUNDARY
Rock Creek
Rock Canyon
Kings Creek
OUACHITA NATIONAL FOREST
POTEAU MOUNTAIN
EAST POTEAU MOUNTAIN
WILDERNESS
FOREST BOUNDARY
Lookout Gap
POTEAU
MOUNTAIN
EMF
EMG
EME
LvC
KC


8
N
R. 29 W.
R. 28 W.
T. 4 N.
(Joins sheet 3)
(Joins sheet 7)
(Joins sheet 9)
(Joins sheet 14)
OUACHITA NATIONAL FOREST
BOUNDARY
Pilot Knob
Round Mountain
Lake Waldron
Square
Rock Creek
Cedar Creek
Packsaddle
POTEAU RIVER WP SITE 6
SCALE 1:20 000
1 MILE
1 KILOMETER
1 365 000 FEET


R. 28 W.
R. 27 W.
T. 4 N.
N
(Joins sheet 4)
(Joins sheet 8)
(Joins sheet 10)
(Joins sheet 15)
OUACHITA
NATIONAL
FOREST
WHITE
OAK
MOUNTAIN
Round Mountain
Petit Jean River
Right Hand Sugar Creek
Sugar Creek
Square Rock Creek
1 MILE
1 KILOMETER
SCALE 1:20 000

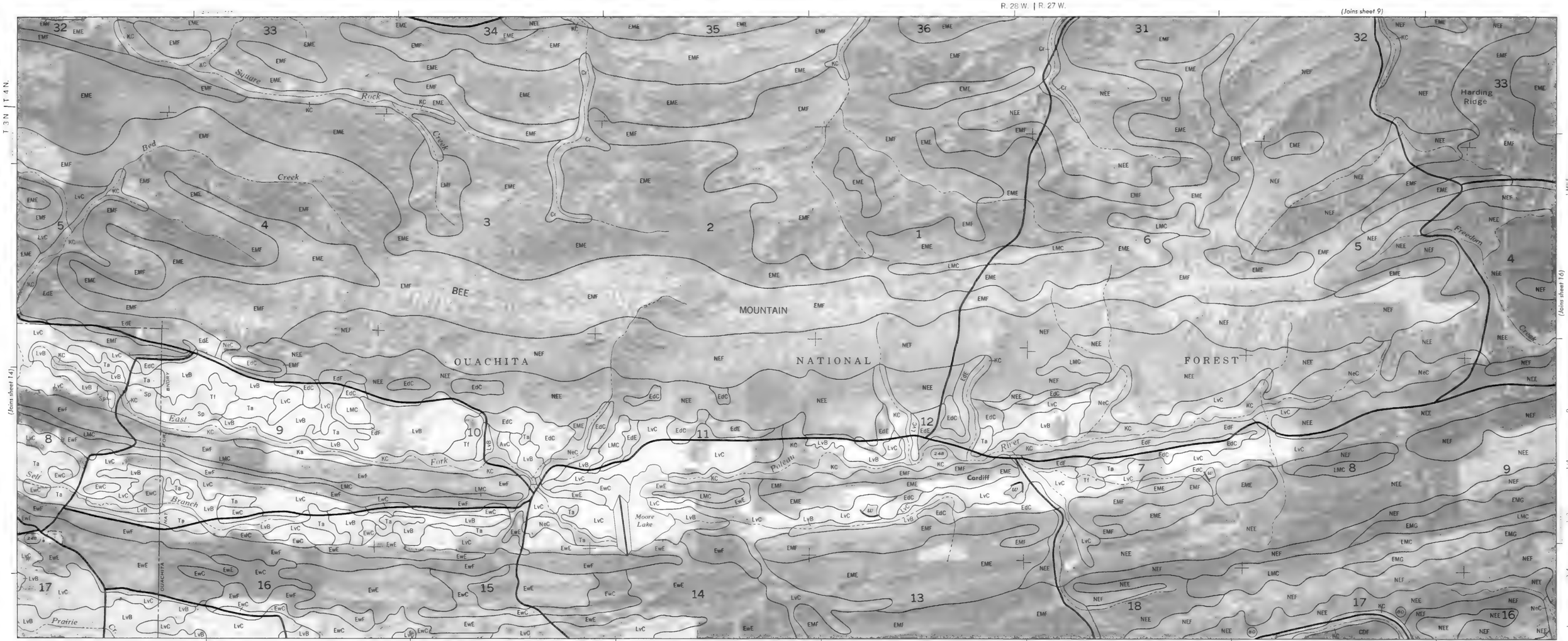

N
(Joins sheet 5)
R. 27 W.
R. 26 W.
1 475 000 FEET
(Joins sheet 9)
1 MILE
1 KILOMETER
SCALE 1:20 000
(Joins inset, sheet 6)
T 4 N
OUACHITA
NATIONAL
FOREST
HOGAN MOUNTAIN
Sugar Creek
Whetstone Creek
Spanish Oak Ridge
Pigeon Creek
Ramsey Creek
Kingdoodle
Coffee MOUNTAIN
Pot Hollow
Rock Quarry Branch
Pollard
JEAN PETIT
Kingdoodle Knob
Mc Branch
(Joins sheet 16)

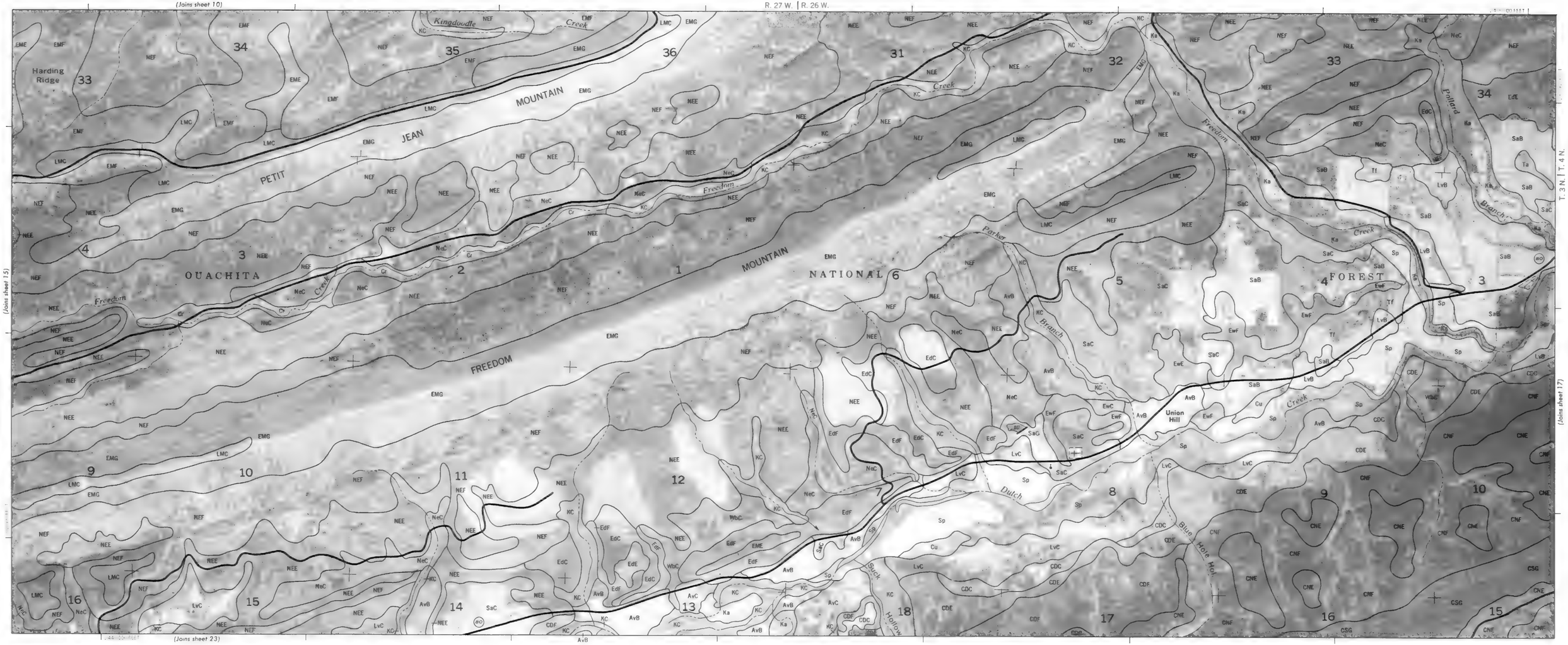

1255000 FEET
R. 26 W.
(Joins sheet 43)
OUACHITA
NAT.
FOR.
MANAGEMENT
AREA
WILDLIFE
MUDDY
CREEK
Murder
Creek
Fourmile
Mountain
MONTGOMERY
COUNTY
YELL
CO.
T. 1 N.
(Joins sheet 48)
1485000 FEET
R. 33 W.
R. 32 W
SEBASTIAN
COUNTY
POTEAU
OUACHITA
NATIONAL
FOREST
MOUNTAIN
Creek
Shadley
Henderson
Mill
Hollow
Scott
Branch
West
East
OKLAHOMA
LE FLORE
CO.
T. 3 N.
(Joins sheet 12)
(Joins sheet 18)
1285000 FEET
1 MILE
1 KILOMETER
SCALE 1:20 000
N


(12)
N
R. 32 W.
R. 31 W.
T. 3 N.
T. 4 N.
(Joins inset A, sheet 5)
(Joins inset B, sheet 5)
(Joins sheet 11)
(Joins sheet 13)
(Joins sheet 19)
1:250,000 FEET
1:125,000 FEET
SCALE 1:20,000
1 MILE
1 KILOMETER
SEBASTIAN COUNTY
POTEAU MOUNTAIN
OUACHITA NATIONAL FOREST
Shadden Creek
Sixmile Creek
East Twomile Creek
Cross Creek
POTEAU RIVER
ARKANSAS WESTERN
Oliver
Cauthron
water
EMF
EME
EMG
KC
NeC
NEE
EdC
LvC
Ta
EdE
EwF
EwE
WbC
LvB
Sp
Cu
CDE

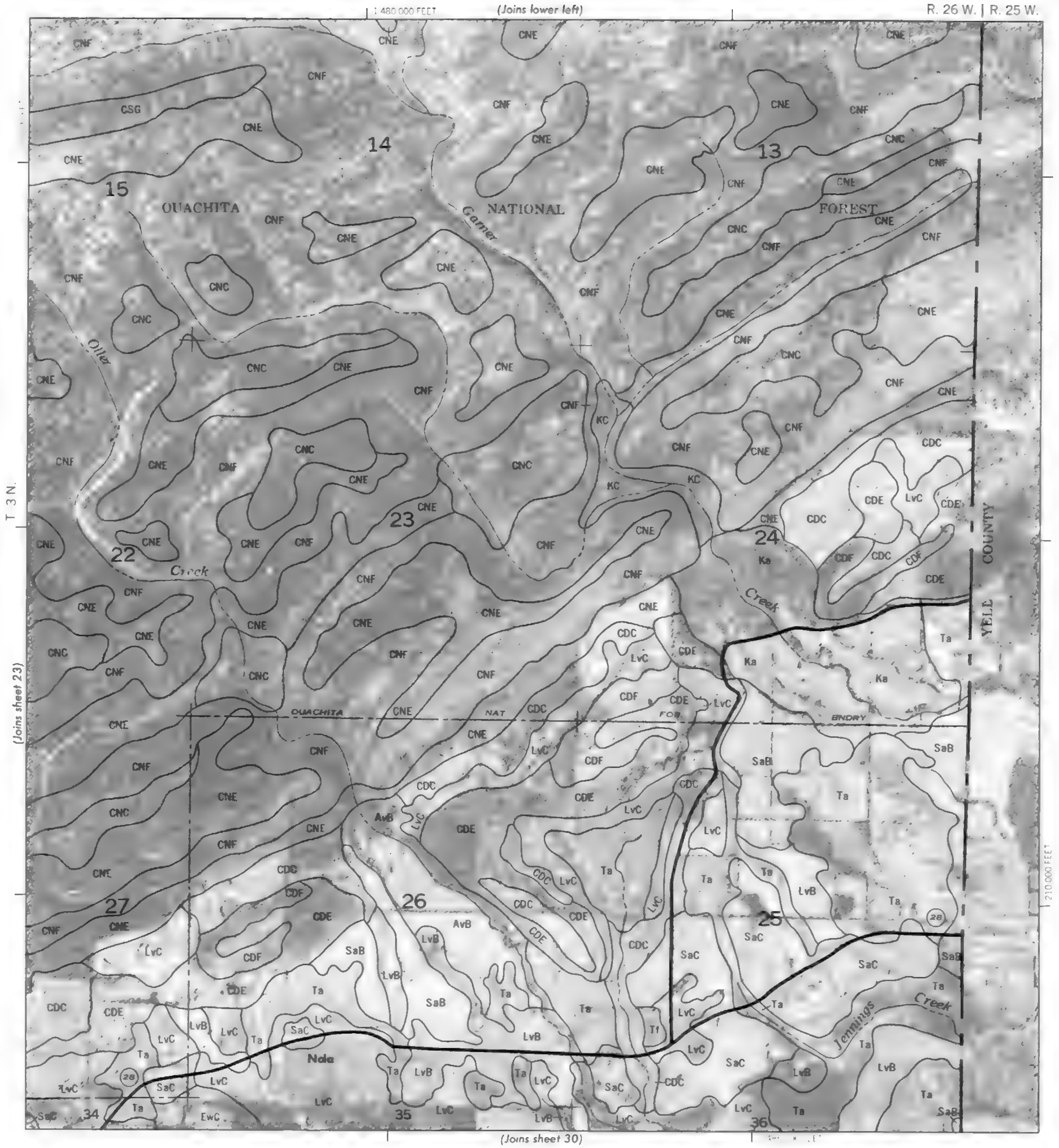

R. 31 W. | R. 30 W.
R. 30 W. | R. 29 W.
T. 3 N. | T. 4 N.
N
(Joins sheet 7)
(Joins sheet 12)
(Joins sheet 14)
(Joins sheet 20)
OUACHITA
NATIONAL
FOREST
OUACHITA NATIONAL FOREST BOUNDARY
WESTERN
ARKANSAS
Bryan
Hon
Evening Shade
Phipps Branch
Jerico
McNally
Stewart Branch
Creek
Presley Creek
Russell Branch
Bull Creek
Jones Creek
POTEAU RIVER
water
OUACHITA
CHALYBEATE
MOUNTAIN
1 MILE
1 KILOMETER
SCALE 1:20 000
0
1/4
1/2
3/4
1

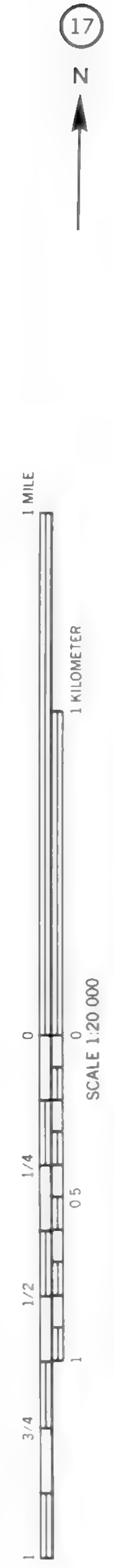

14
N
(Joins sheet 8)
R. 29 W. | R. 28 W.
1 400 000 FEET
T. 3 N. | T. 4 N.
OUACHITA NATIONAL FOREST
Square Rock Ridge
BOUNDARY
Clear Creek
Mill Creek
Mud Creek
Self Creek
Fork
East Fork
Prairie Creek
Polecat Creek
water
71
71 BUS
(Joins sheet 13)
(Joins sheet 15)
(Joins sheet 21)
1 MILE
1 KILOMETER
SCALE 1:20 000

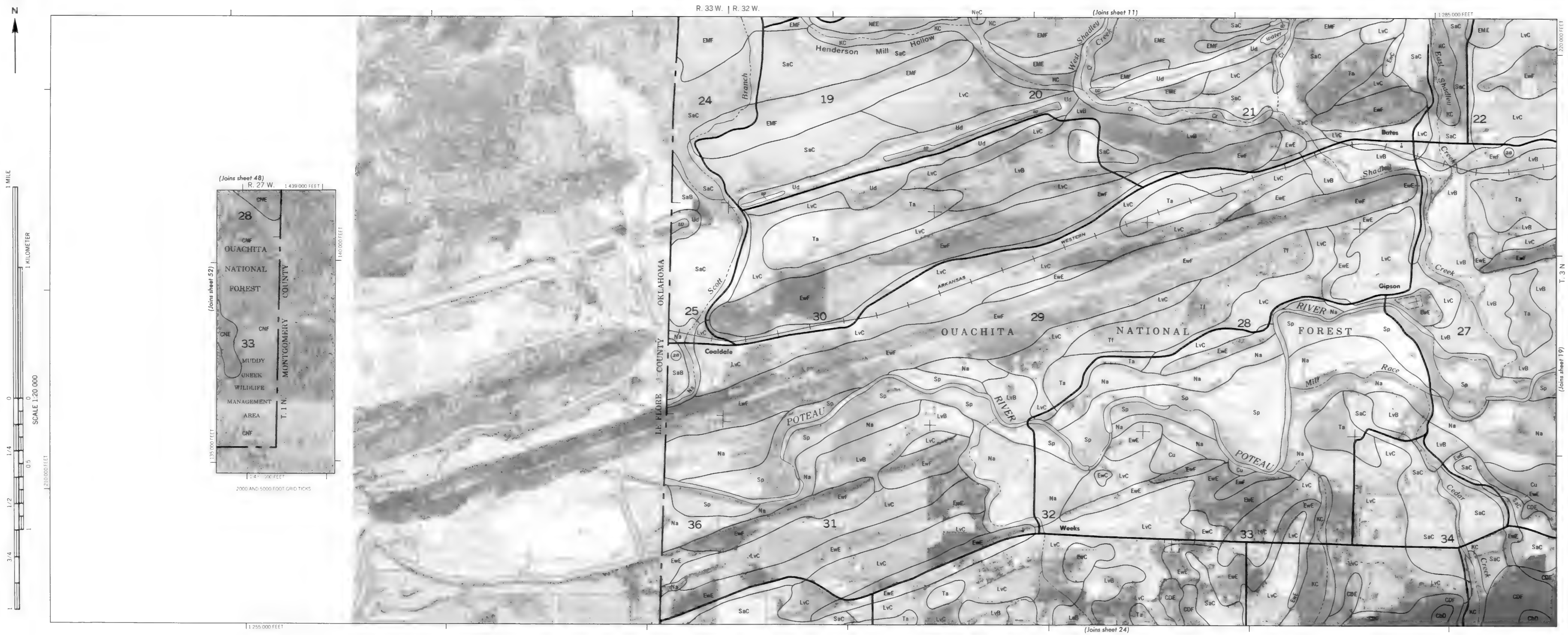

R. 28 W.
R. 27 W.
T 3 N.
T 4 N.
(Joins sheet 9)
(Joins sheet 14)
(Joins sheet 16)
(Joins sheet 22)
N
1 MILE
1 KILOMETER
SCALE 1:20 000
Suture Rock Creek
Bee Creek
BEE MOUNTAIN
OUACHITA NATIONAL FOREST
Harding Ridge
Freedom Creek
Self Branch
East Fork
Moore Lake
Cardiff
Prairie Cr.
Plateau
River
OUACHITA NATIONAL FOREST BNDRY

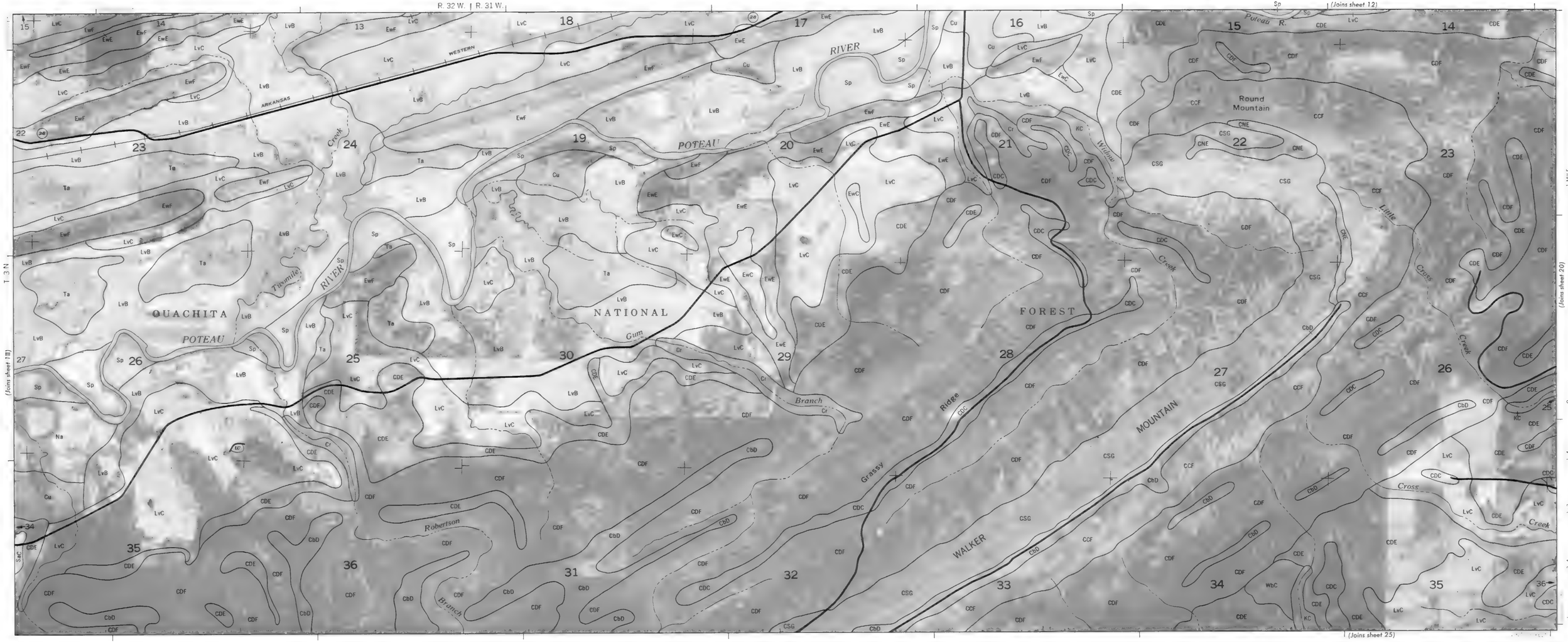

16
N
(Joins sheet 10)
R. 27 W.
R. 26 W.
T. 3 N.
T. 4 N.
Harding Ridge
MOUNTAIN
JEAN
PETIT
OUACHITA
NATIONAL
FOREST
FREEDOM
Kingdoodle Creek
Freedom Creek
Parker Branch
Pollard Branch
Dutch Creek
Union Hill
Blue Hole Hollow
Buck Hollow
1 MILE
1 KILOMETER
SCALE 1:20 000
(Joins sheet 15)
(Joins sheet 17)
(Joins sheet 23)

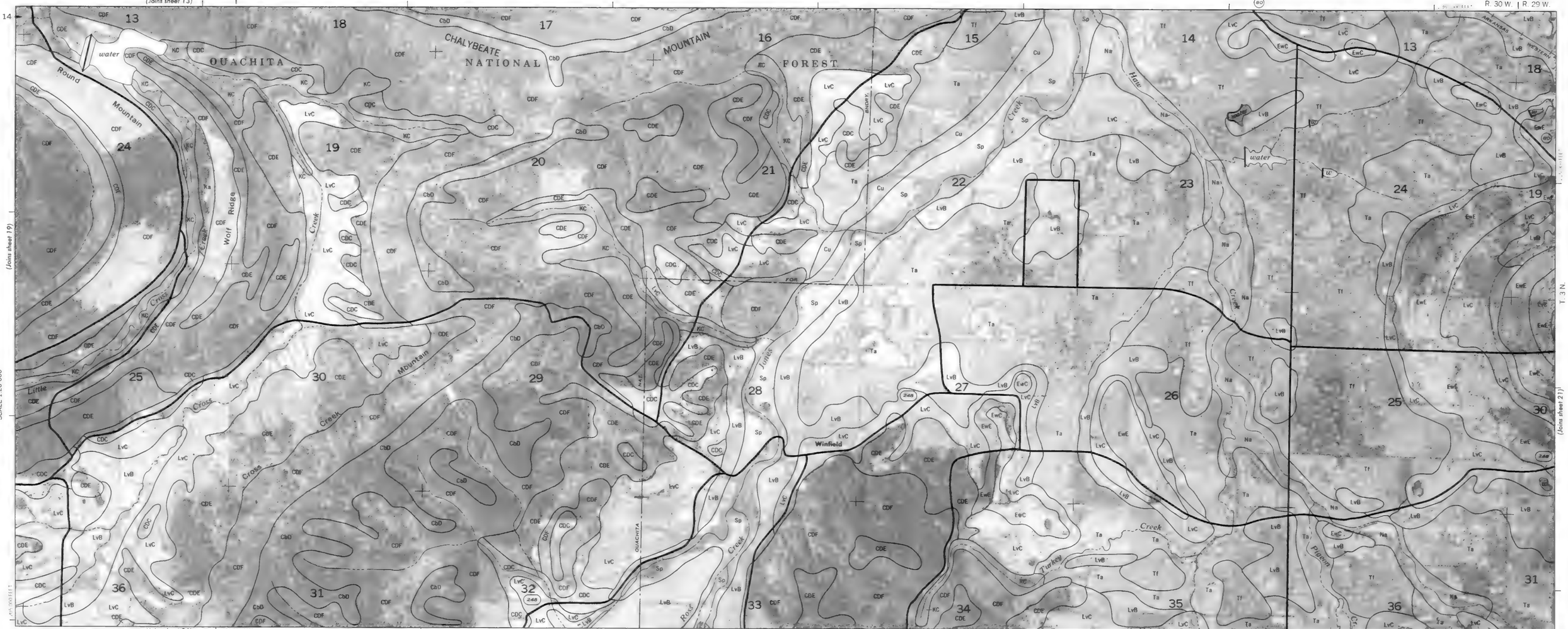

(Joins inset, sheet 6)
R. 26 W. | R. 25 W.
T. 3 N. | T. 4 N.
(Joins sheet 16)
OUACHITA NATIONAL FOREST
YELL COUNTY
Dutch Creek
Pollard Branch
Oil Well Hollow
Chop Off Mountain
(Joins inset)


(Joins lower left)
R. 26 W. | R. 25 W.
T. 3 N.
(Joins sheet 23)
OUACHITA NATIONAL FOREST
YELL COUNTY
Garner Creek
Olive Creek
Jennings Creek
Nola
(Joins sheet 30)

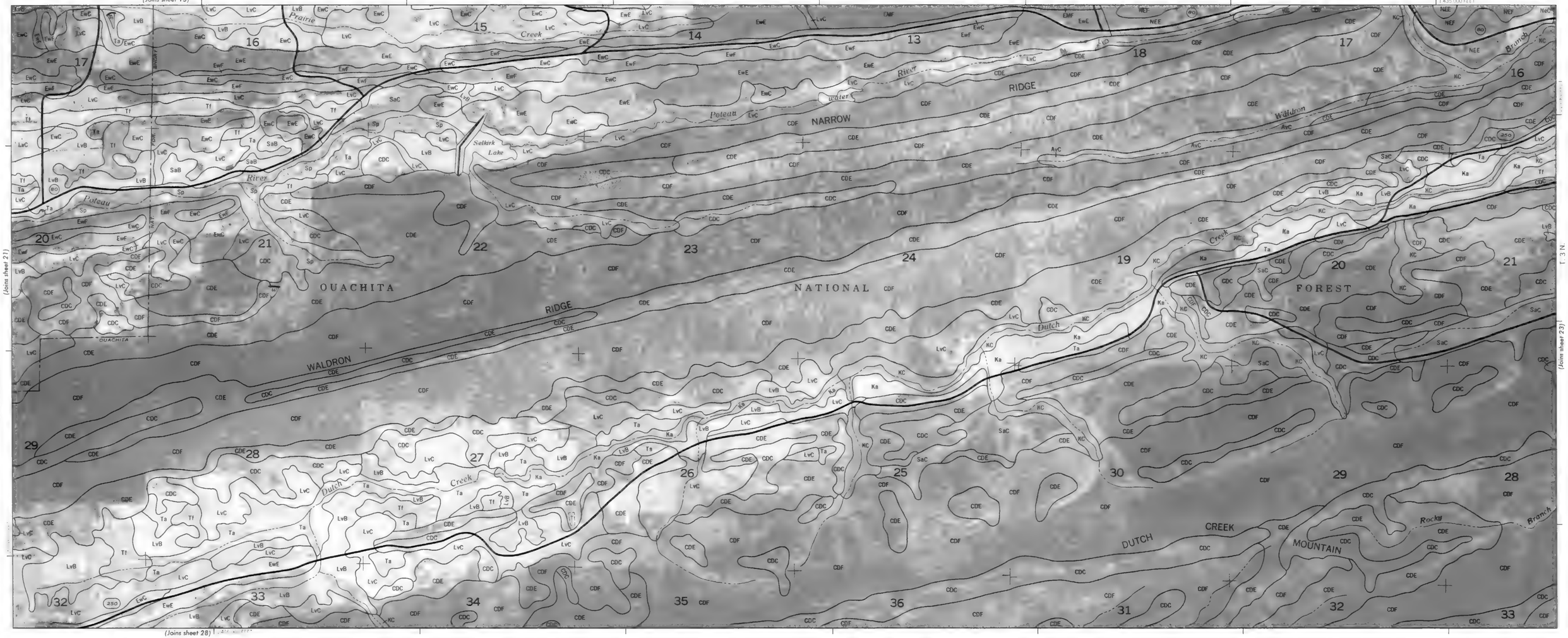

17
N
MILE
1 KILOMETER
SCALE 1:20 000


N
R. 33 W. | R. 32 W.
(Joins sheet 11)
(Joins sheet 24)
(Joins sheet 19)
(Joins sheet 48)
(Joins sheet 52)
R. 27 W.
T. 3 N.
T. 1 N.
OKLAHOMA
LE FLORE COUNTY
MONTGOMERY COUNTY
OUACHITA NATIONAL FOREST
MUDDY CREEK WILDLIFE MANAGEMENT AREA
Henderson Mill Hollow
Scott Branch
West Shadley Creek
East Shadley Creek
Shadley Creek
Mill Race
Cedar Creek
POTEAU RIVER
WESTERN ARKANSAS
Cauldale
Bates
Gipson
Weeks
1 MILE
1 KILOMETER
SCALE 1:20 000
2000 AND 5000 FOOT GRID TICKS
1 255 000 FEET
1 285 000 FEET
220 000 FEET
210 000 FEET
1 439 000 FEET
140 000 FEET
135 000 FEET

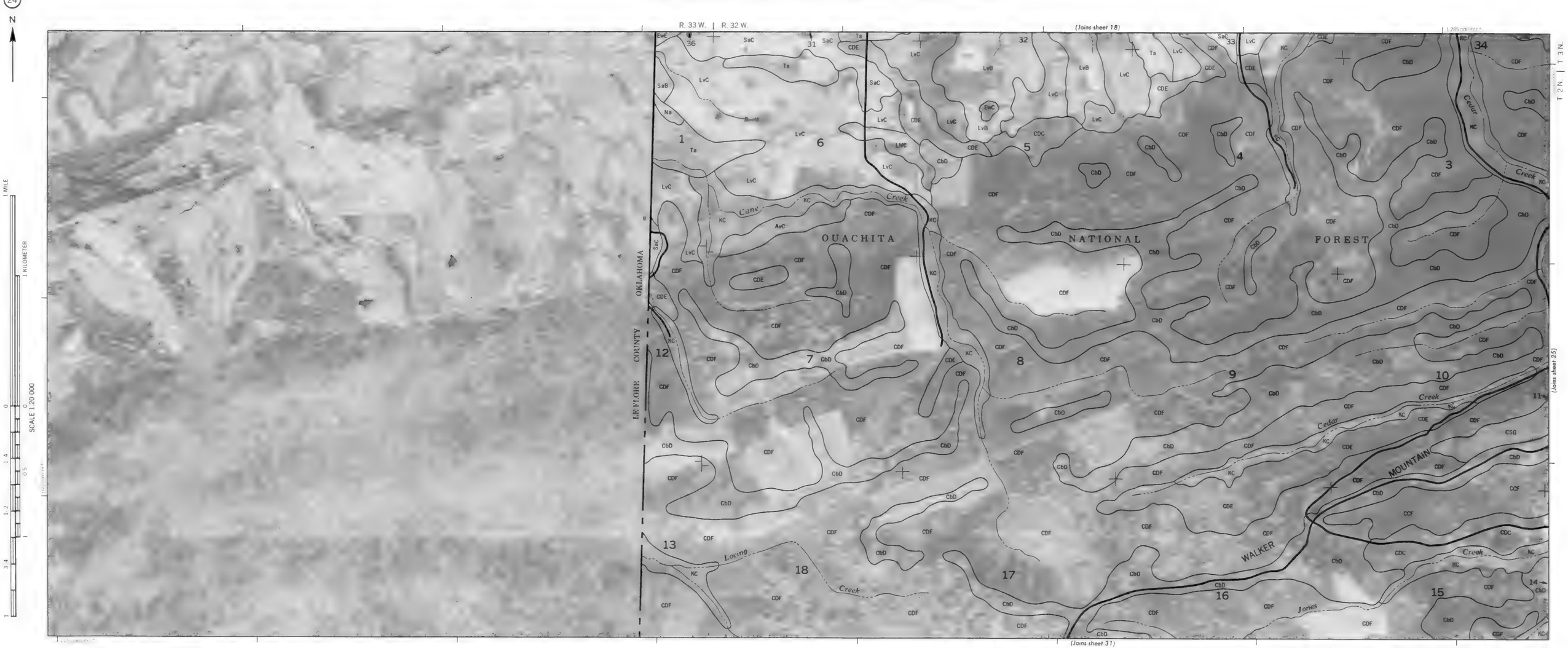

R. 32 W.
R. 31 W.
T. 3 N.
(Joins sheet 18)
(Joins sheet 12)
(Joins sheet 20)
(Joins sheet 25)
QUACHITA
NATIONAL
FOREST
POTEAU
RIVER
WESTERN
ARKANSAS
Poteau R.
Round Mountain
MOUNTAIN
WALKER
Tusmile Creek
Gum Branch
Robertson Branch
Grassy Ridge
Little Cross Creek
Williams Creek
SCALE 1:20 000
1 MILE
1 KILOMETER
N

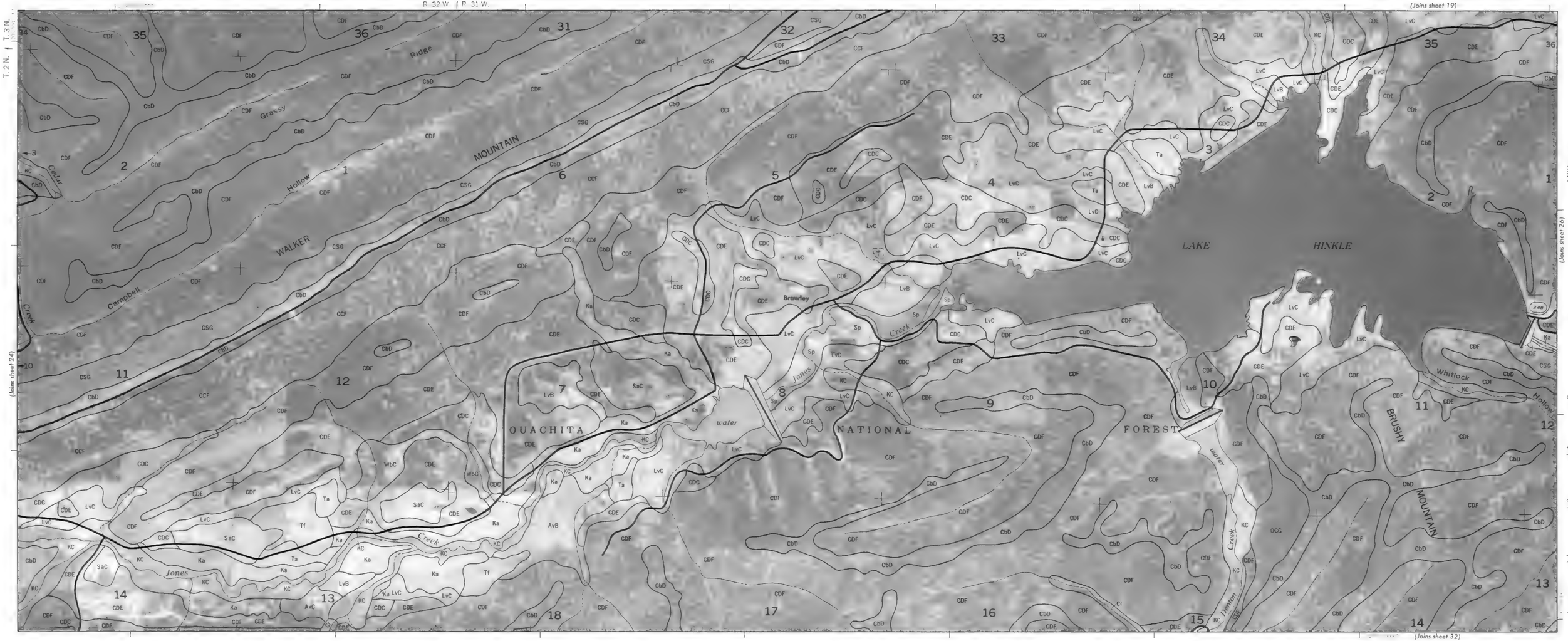

20
N
R. 31 W.
R. 30 W.
R. 29 W.
(Joins sheet 13)
(Joins sheet 19)
(Joins sheet 21)
(Joins sheet 26)
T. 3 N.
OUACHITA NATIONAL FOREST
CHALYBEATE MOUNTAIN
Round Mountain
Wolf Ridge
Cross Creek
Little Cross Mountain
Jones Creek
Ouachita River
Rose Creek
Turkey Creek
Pigeon Creek
Hare Creek
Winfield
water
SCALE 1:20 000
1 MILE
1 KILOMETER
1 330 000 FEET

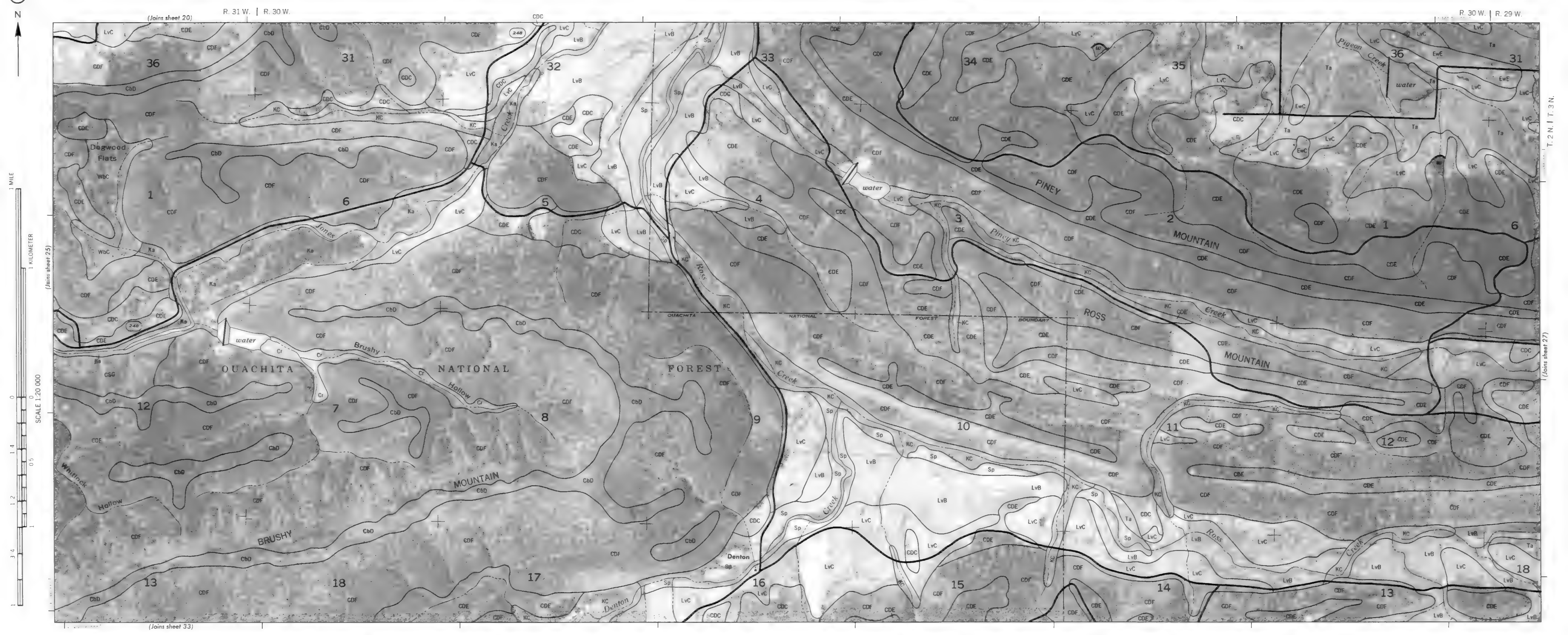

R. 29 W.
R. 28 W.
(Joins sheet 14)
T. 3 N.
(Joins sheet 20)
(Joins sheet 22)
(Joins sheet 27)
N
Anderson
POTEAU
Fork
LUSH
RIVER
SEWAGE LAGOON
SEWAGE LAGOON
ARKANSAS
WESTERN
WALDRON
(county seat)
Hill
Bobinstein
WALDRON CITY AIRPORT
POTEAU
RIVER
OUACHITA
NATIONAL
FOREST
BOUNDARY
OUACHITA NATIONAL FOREST
1 MILE
1 KILOMETER
SCALE 1:20 000


N
(Joins sheet 15)
R. 28 W.
R. 27 W.
1 435 000 FEET
T. 3 N.
(Joins sheet 23)
(Joins sheet 21)
(Joins sheet 28)
SCALE 1:20 000
1 KILOMETER
1 MILE
Prairie Creek
Poteau River
Selkirk Lake
NARROW RIDGE
Waldron Creek
Dutch Creek
OUACHITA NATIONAL FOREST
OUACHITA RIDGE
WALDRON
DUTCH CREEK MOUNTAIN
Rocky Branch

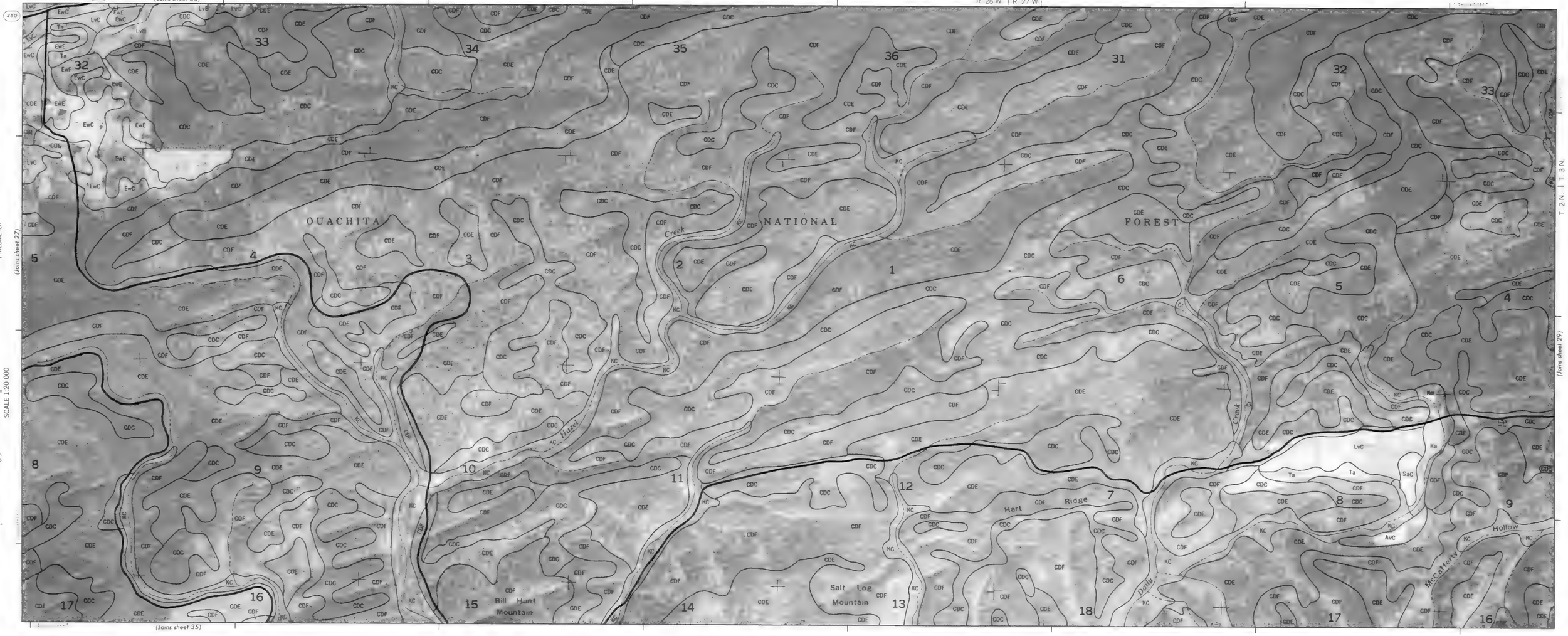
SOIL SURVEY OF SCOTT COUNTY, ARKANSAS - SHEET NUMBER 23

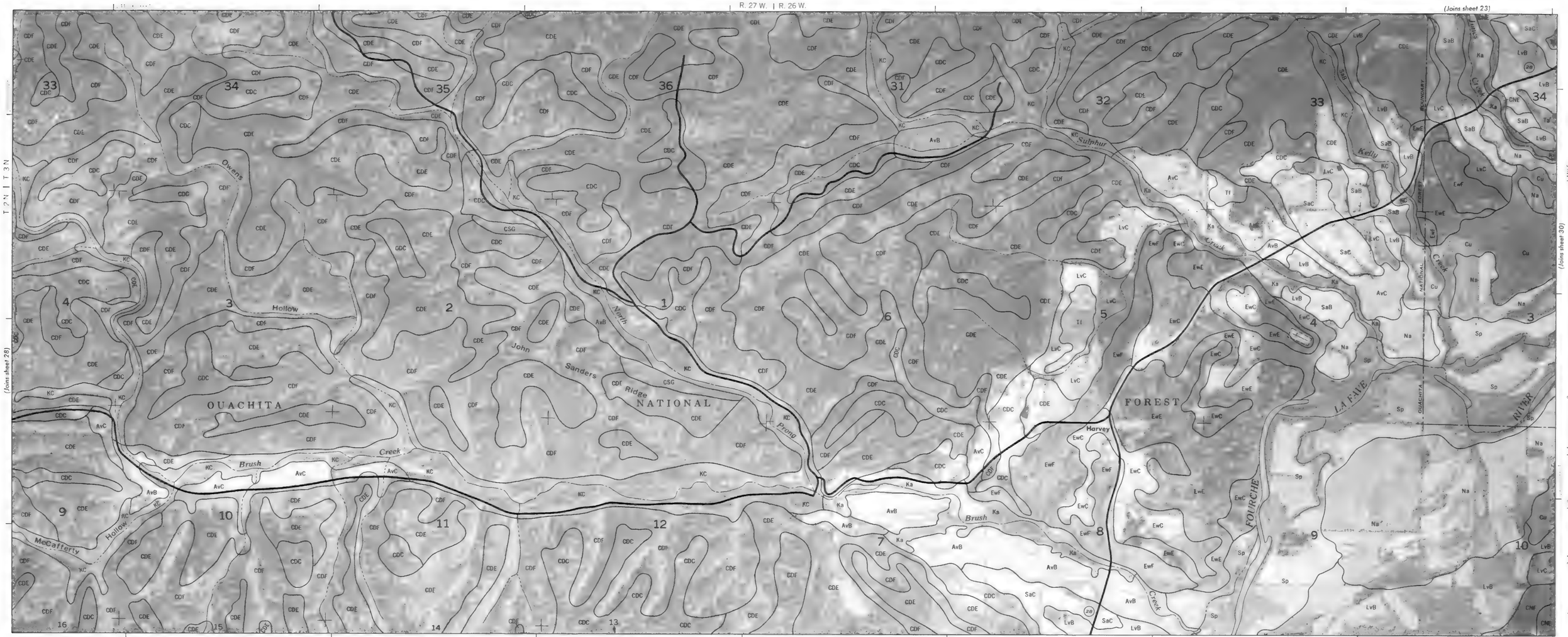

24
N
R. 33 W.
R. 32 W.
T 2 N.
T 3 N.
(Joins sheet 18)
(Joins sheet 25)
(Joins sheet 31)
OKLAHOMA
LE FLORE COUNTY
OUACHITA NATIONAL FOREST
SCALE 1:20 000
1 MILE
1 KILOMETER
Cane Creek
Cedar Creek
Loving Creek
Jones Creek
MOUNTAIN
WALKER
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
31
32
33
34
36
CbD
CDF
CDE
LvC
LvB
SaC
SaB
Ta
Na
AvC
EwC
EmC
LMC
KC
CSG
CCF
CDC

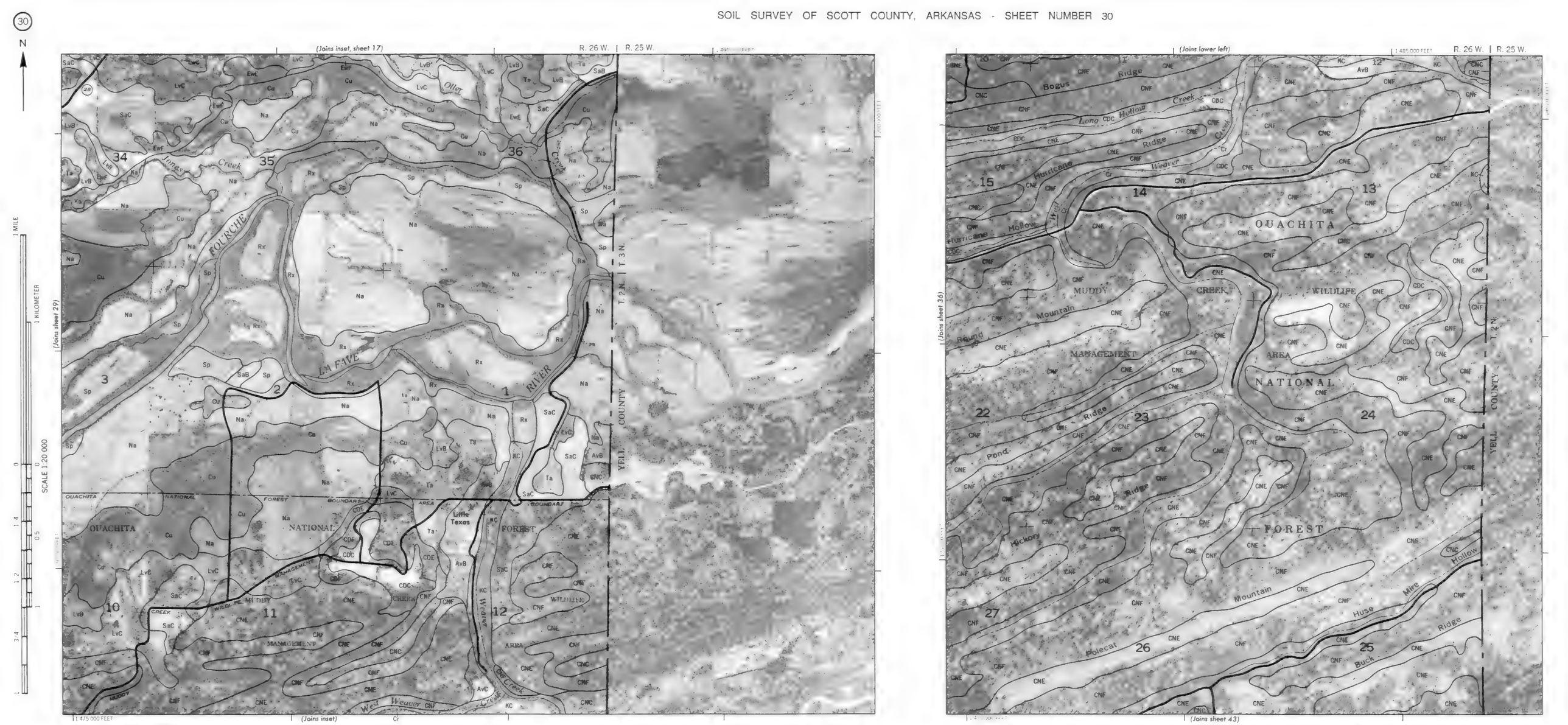

R. 32 W. | R. 31 W.
T. 2 N. | T. 3 N.
(Joins sheet 19)
(Joins sheet 24)
(Joins sheet 26)
(Joins sheet 32)
N
1 MILE
1 KILOMETER
SCALE 1:20 000
LAKE HINKLE
OUACHITA NATIONAL FOREST
MOUNTAIN
WALKER
Ridge
Grassy
Hollow
Cedar
Campbell
Creek
Jones
Brawley
Whitlock
BRUSHY
Dierkon
water

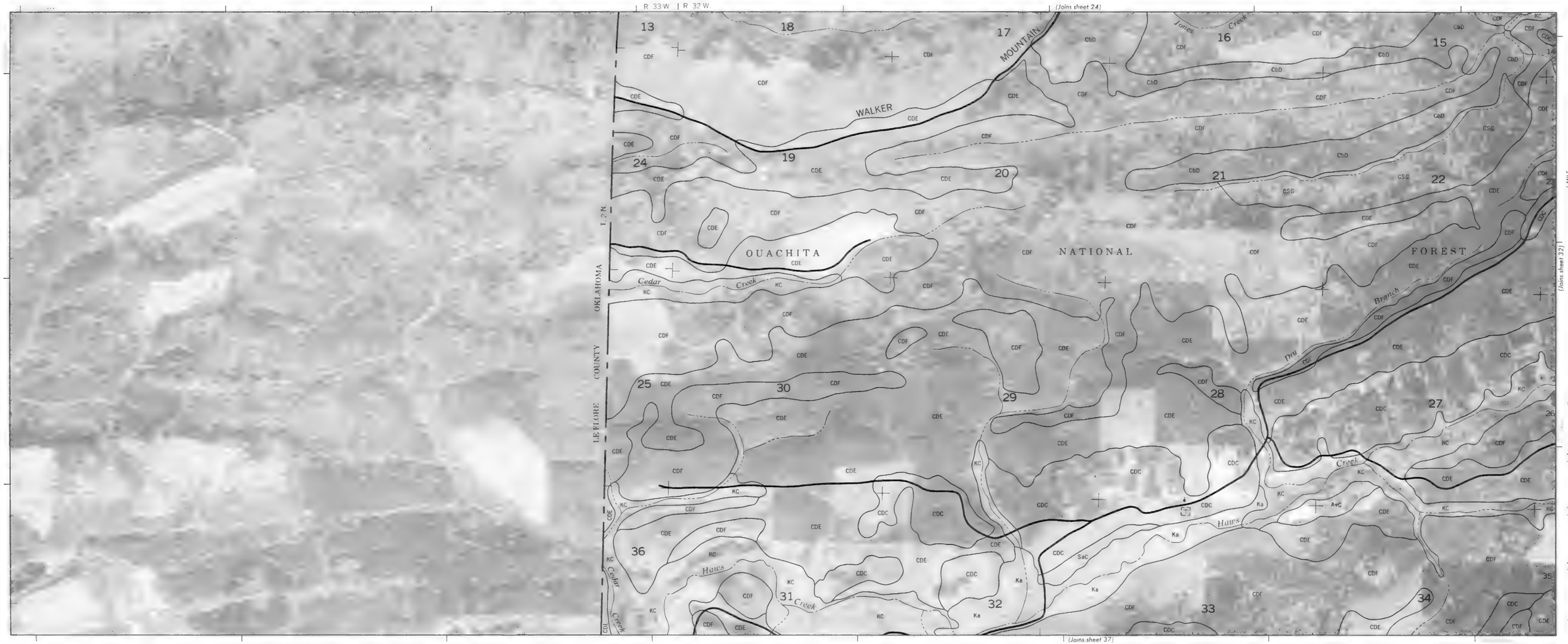

26
N
(Joins sheet 20)
R. 31 W. | R. 30 W.
R. 30 W. | R. 29 W.
T. 2 N. | T. 3 N.
(Joins sheet 25)
(Joins sheet 27)
(Joins sheet 33)
1 MILE
1 KILOMETER
SCALE 1:20 000
Dogwood Flats
Jones Creek
OUACHITA NATIONAL FOREST
Brushy Hollow
BRUSHY MOUNTAIN
Whitlock Hollow
PINEY MOUNTAIN
Piney Creek
ROSS MOUNTAIN
Ross Creek
Pigeon Creek
OUACHITA NATIONAL FOREST BOUNDARY
Denton Creek
Denton
water

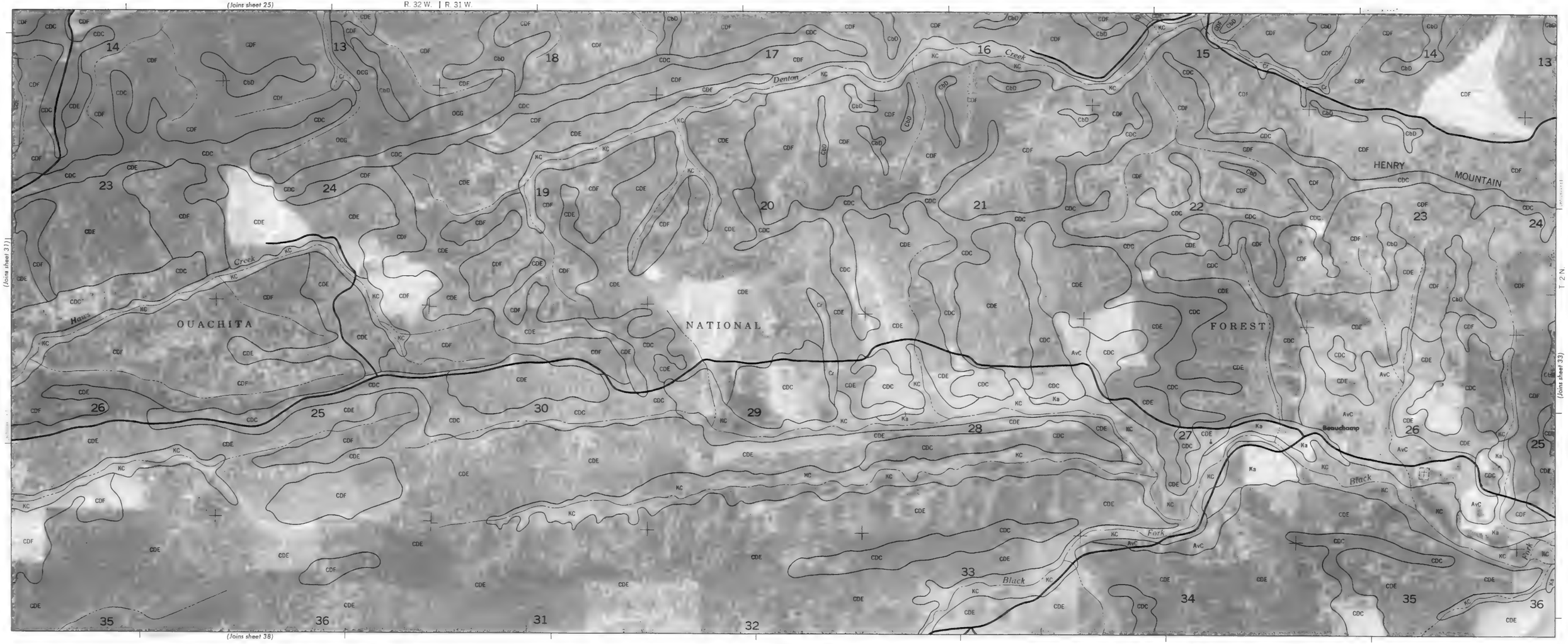

R. 29 W.
R. 28 W.
(Joins sheet 21)
T. 2 N.
T. 3 N.
(Joins sheet 26)
(Joins sheet 28)
(Joins sheet 34)
1 395 000 FEET
N
SCALE 1:20 000
1 MILE
1 KILOMETER
Haw Creek
Ross Creek
Buffalo Creek
Little
water
The Pines
MOUNTAIN
PINEY
ROSS
OUACHITA NATIONAL FOREST
OUACHITA NATIONAL FOREST BOUNDARY
71 (BUS)
71
250
KC

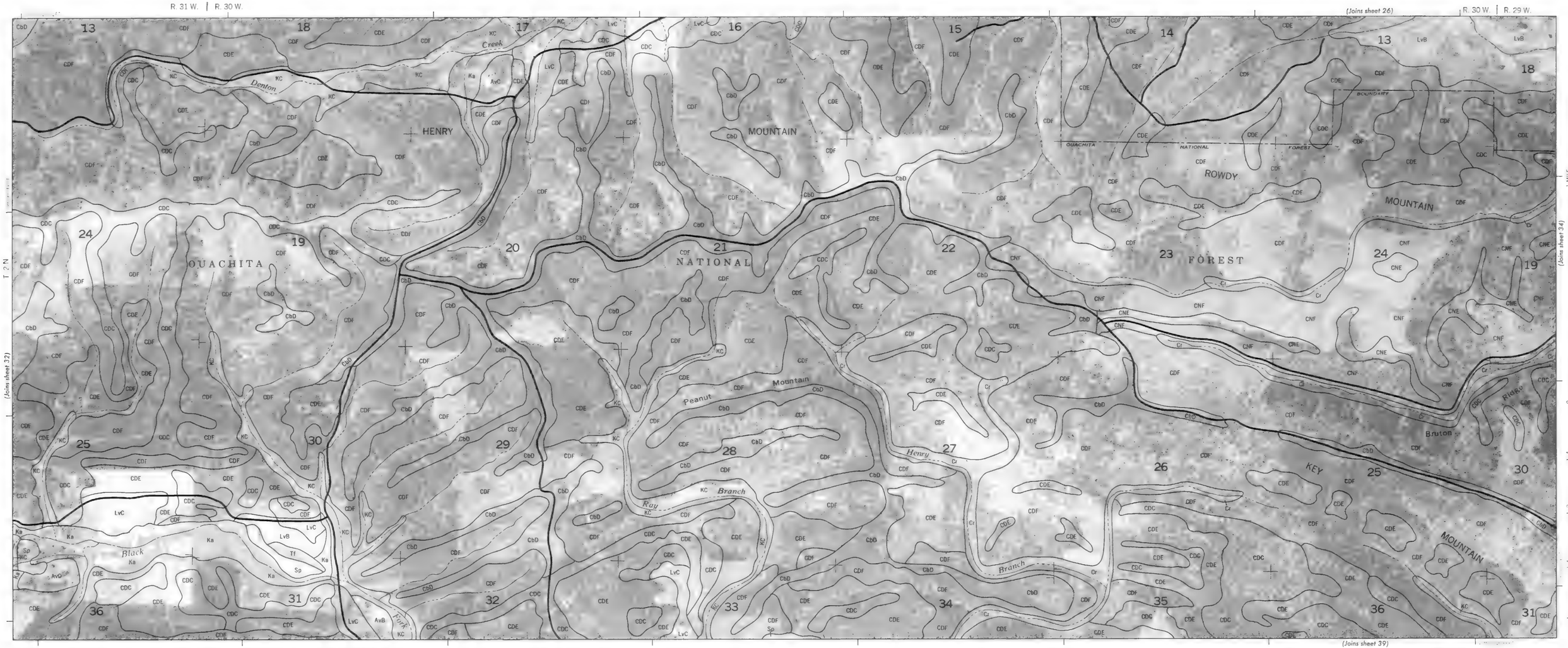

28
N
(Joins sheet 22)
R 28 W
R 27 W
T 2 N
T 3 N
OUACHITA NATIONAL FOREST
Hazel Creek
Hart Ridge
Salt Log Mountain
Bill Hunt Mountain
Daily Hollow
McCafferty Hollow
(Joins sheet 27)
(Joins sheet 29)
(Joins sheet 35)
1 MILE
1 KILOMETER
SCALE 1:20 000

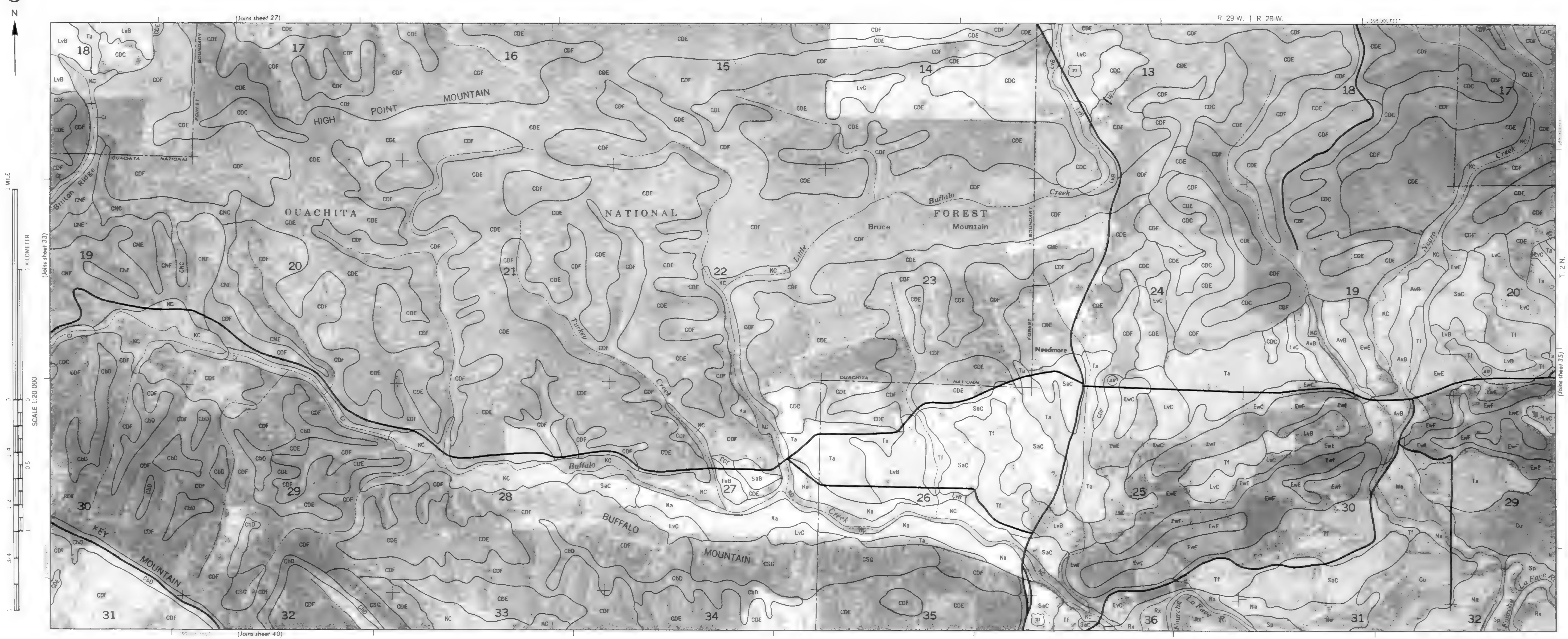

R. 27 W.
R. 26 W.
T 2 N
T 1 T 3 N
(Joins sheet 23)
(Joins sheet 28)
(Joins sheet 30)
(Joins sheet 36)
OUACHITA NATIONAL FOREST
Owens
Hollow
John Sanders
Ridge
North
Prong
Brush
Creek
McCafferty
Hollow
Harvey
Kelly
Sulphur
Creek
LA FAVE
RIVER
FOURCHE
Creek
Brush
Creek
QUACHITA NATIONAL FOREST BOUNDARY
1 MILE
1 KILOMETER
SCALE 1:20 000
1 470 000 FEET
N


30
N
(Joins inset, sheet 17)
R. 26 W.
R. 25 W.
T. 3 N.
T. 2 N.
YELL COUNTY
(Joins sheet 29)
(Joins sheet 36)
(Joins lower left)
(Joins inset)
(Joins sheet 43)
1 MILE
1 KILOMETER
SCALE 1:20 000
1 475 000 FEET
OUACHITA NATIONAL FOREST
OUACHITA NATIONAL FOREST BOUNDARY
MUDDY CREEK MANAGEMENT AREA
WILDLIFE MANAGEMENT AREA
Little Texas
Jones Creek
FOURCHE LA FAVE RIVER
Otter Creek
Weaver Creek
West Weaver Creek
Bogus Creek
Long Hollow Creek
Hurricane Creek
West Hurricane Hollow
Round Mountain
Pond Ridge
Hickory Hollow
Polecat Mountain
Huse Mire Ridge
Buck Ridge
34
35
36
1
2
3
10
11
12
13
14
15
22
23
24
25
26
27

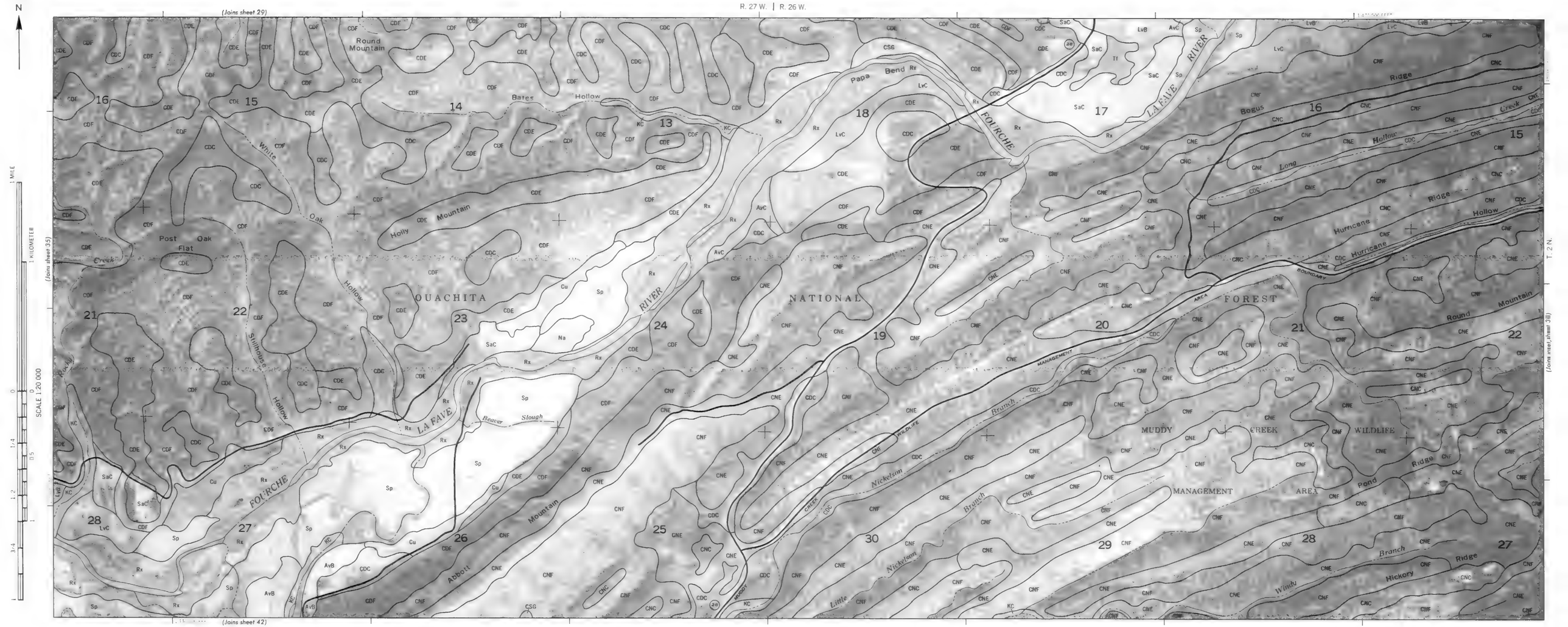

R 33 W
R 32 W.
(Joins sheet 24)
T 2 N
OKLAHOMA
LE FLORE COUNTY
OUACHITA NATIONAL FOREST
WALKER MOUNTAIN
Jones Creek
Cedar Creek
Haws Creek
Haws Creek
Cedar Creek
Creek
Branch
Creek
(Joins sheet 32)
(Joins sheet 37)
N
1 MILE
1 KILOMETER
SCALE 1:20 000

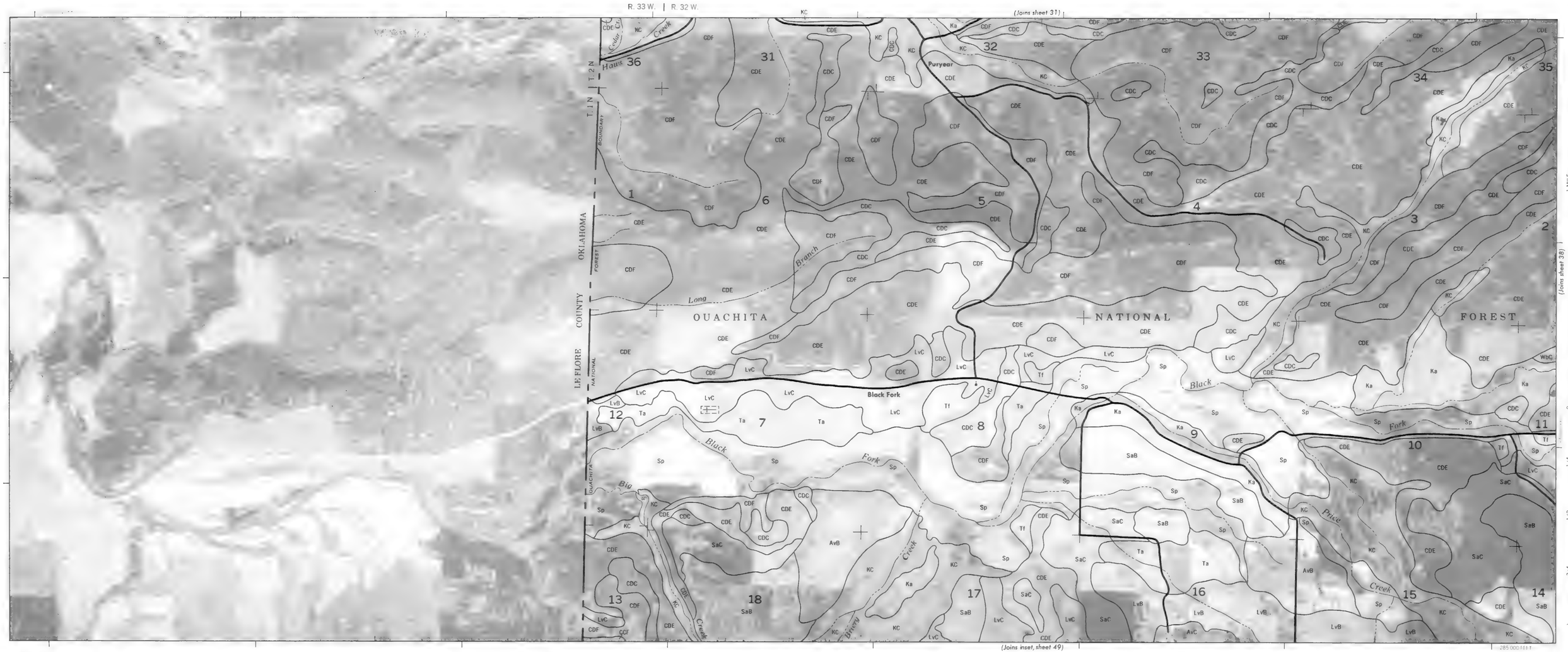

32
N
(Joins sheet 25)
R. 32 W.
R. 31 W.
T. 2 N.
(Joins sheet 31)
(Joins sheet 33)
(Joins sheet 38)
1 MILE
1 KILOMETER
SCALE 1:20 000
OUACHITA
NATIONAL
FOREST
HENRY
MOUNTAIN
Denton
Creek
Haws
Beauchamp
Black
Fork
Cr
CDF
CDC
CDE
CbD
OCG
KC
AvC
Ka

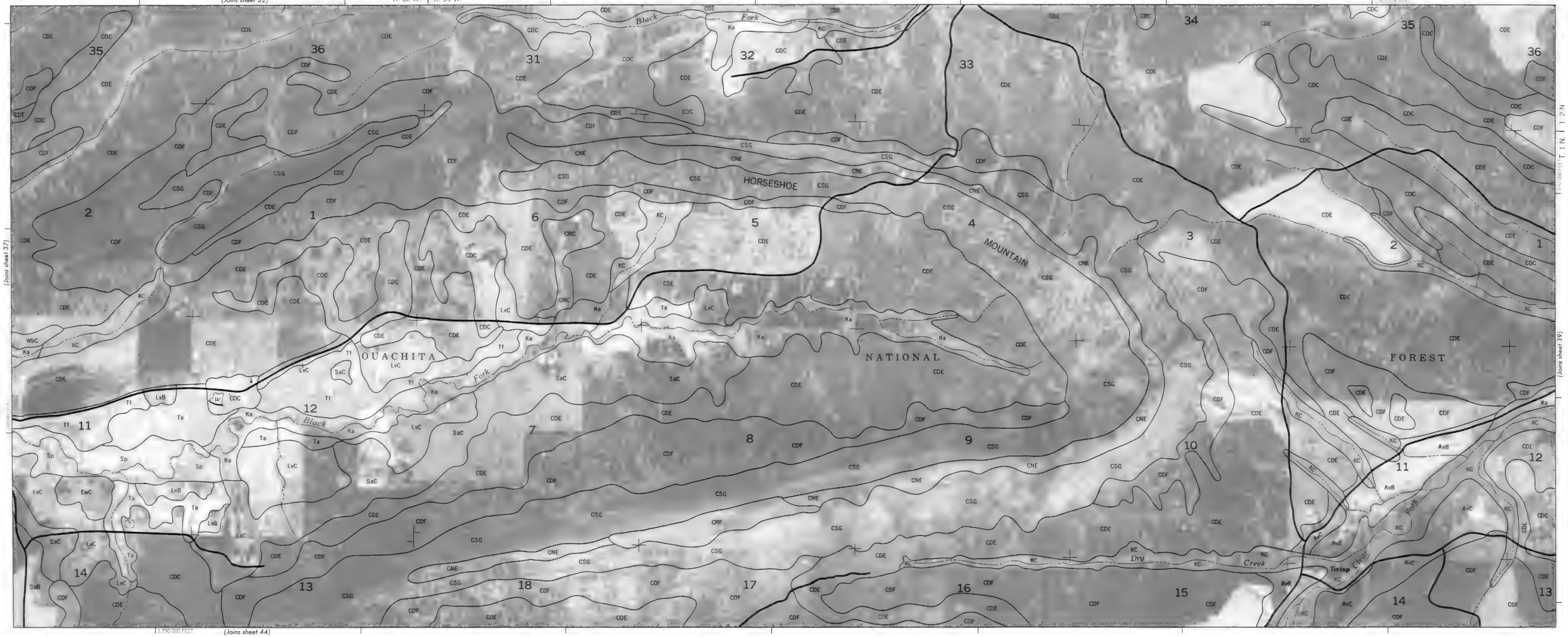

R. 31 W.
R. 30 W.
R. 30 W.
R. 29 W.
T 2 N
(Joins sheet 32)
(Joins sheet 26)
(Joins sheet 34)
(Joins sheet 39)
N
1 MILE
1 KILOMETER
SCALE 1:20 000
HENRY
MOUNTAIN
OUACHITA
NATIONAL
FOREST
ROWDY
MOUNTAIN
BOUNDARY
Denton
Creek
Peanut
Mountain
Henry
Branch
Ray
Branch
Black
Fork
Richey
Bruton
KEY
MOUNTAIN

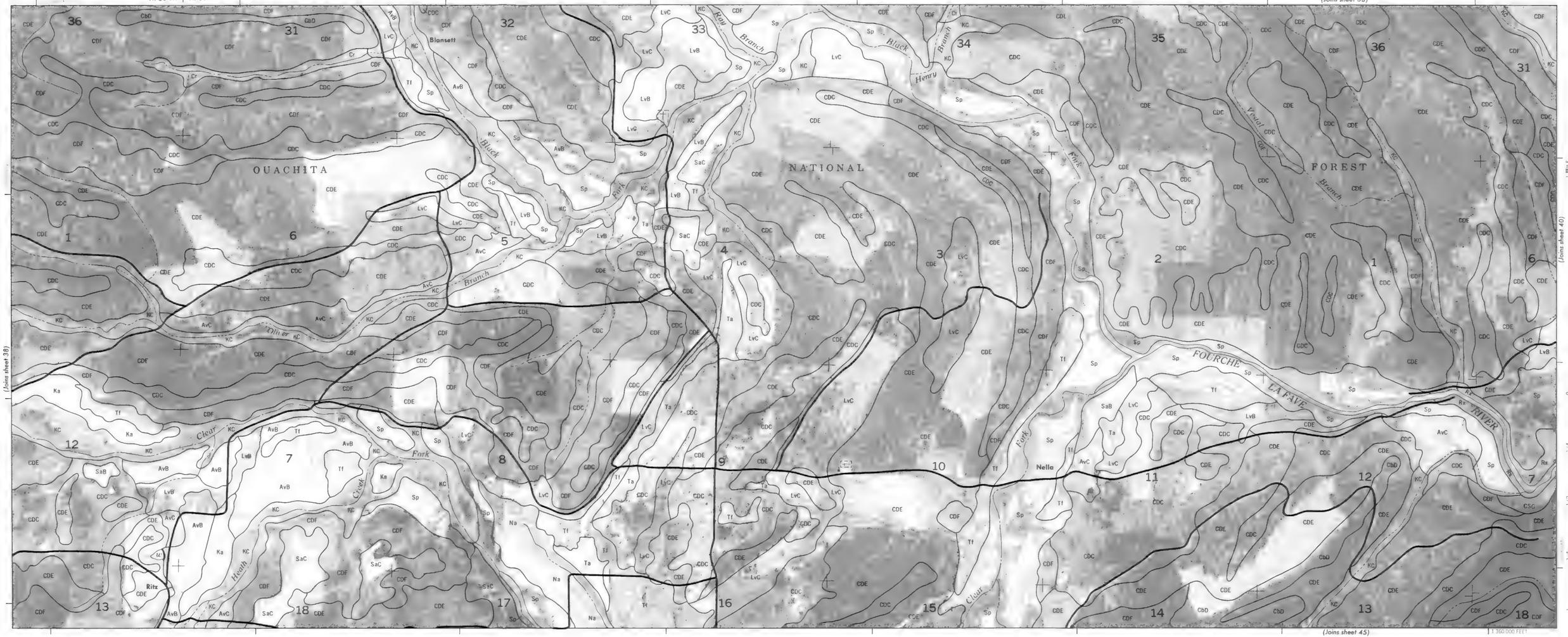

N
(Joins sheet 27)
(Joins sheet 40)
(Joins sheet 33)
(Joins sheet 35)
R. 29 W. | R. 28 W.
T. 2 N.
1 MILE
1 KILOMETER
SCALE 1:20 000
HIGH POINT MOUNTAIN
OUACHITA NATIONAL FOREST
Bruce Mountain
Bruton Ridge
Needmore
BUFFALO MOUNTAIN
KEY MOUNTAIN
Buffalo Creek
Little Buffalo Creek
Turkey Creek
Negro Creek
Fourche La Fave R.
FOREST BOUNDARY

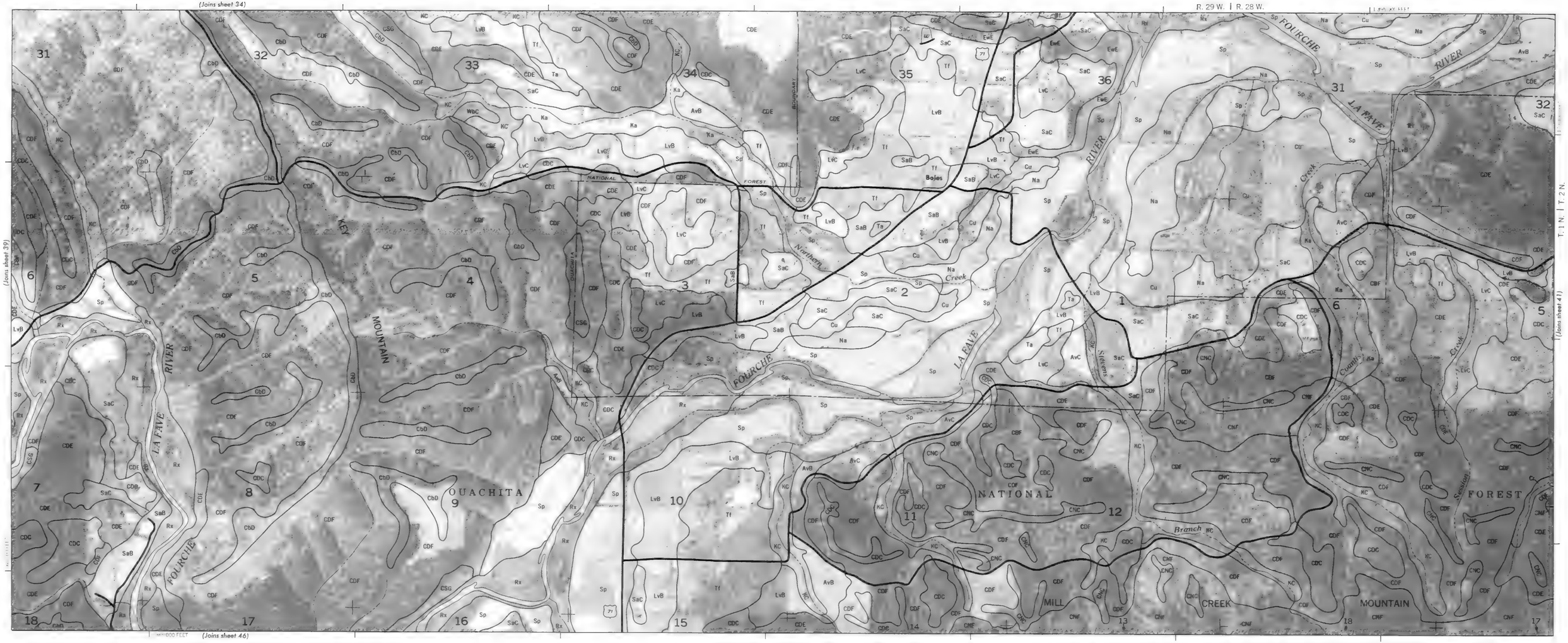

R 25 W
R 27 W
T. 2 N.
(Joins sheet 34)
(Joins sheet 28)
(Joins sheet 36)
(Joins sheet 41)
OUACHITA NATIONAL FOREST
BOUNDARY
Gilbreath Mountain
Bill Hunt Mountain
McCafferty Hollow
High Peak
BRUSHY MOUNTAIN
Rocky Creek
Daily Creek
Catalpa Creek
Mud Creek
Williams Branch
John Allen Branch
Hollow
Schoolhouse Ridge
Parks
water
LA FAVE RIVER
FOURCHE LA FAVE RIVER
Little Cedar Cr.
N
1 MILE
1 KILOMETER
SCALE 1:20 000
1 435 000 FEET

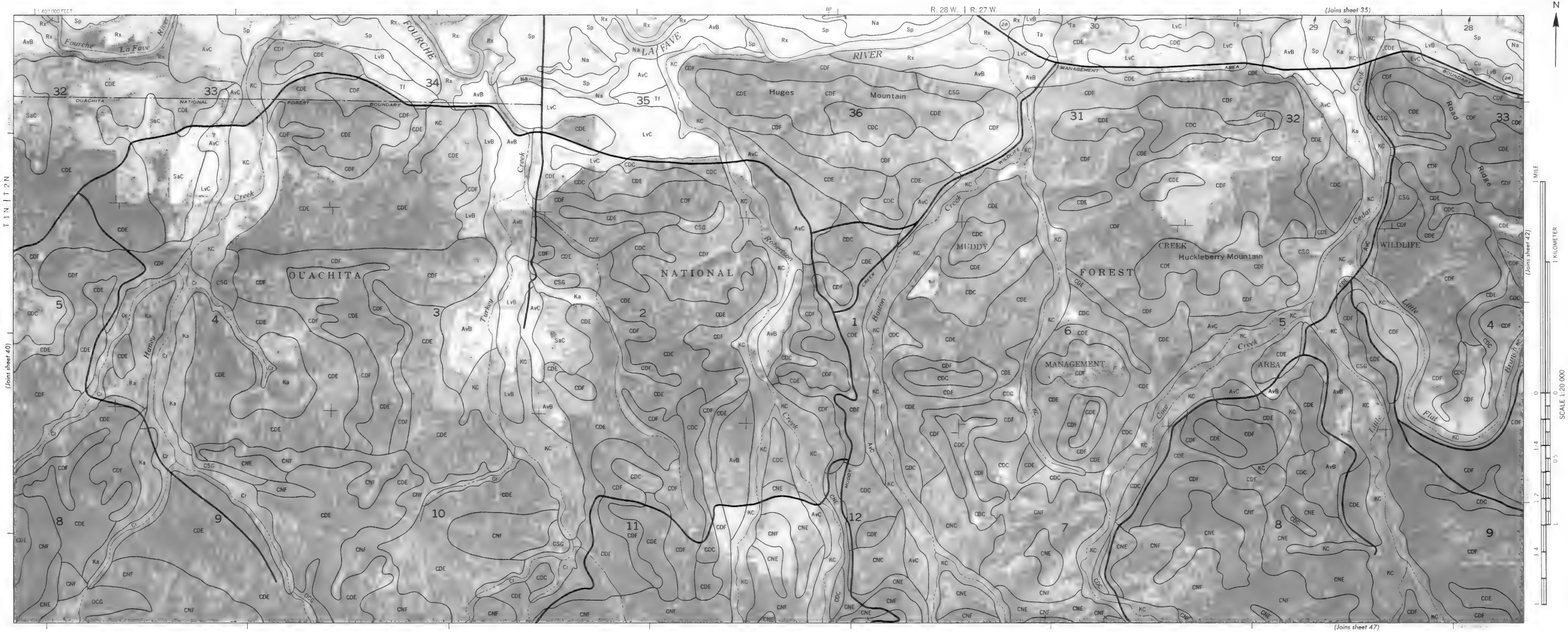

N
(Joins sheet 29)
R. 27 W.
R. 26 W.
T. 2 N.
(Joins inset, sheet 38)
(Joins sheet 35)
(Joins sheet 42)
1 MILE
1 KILOMETER
SCALE 1:20 000
Round Mountain
Bates Hollow
Papa Bend
LA FAVE RIVER
FOURCHE
Ridge
Bogus
Creek
Long
Hollow
Hurricane
Round Mountain
White Oak
Holly Mountain
Post Oak Flat
Creek
Hollow
OUACHITA NATIONAL FOREST
RIVER
Shinpaugh Hollow
Beaver Slough
LA FAVE
FOURCHE
Mountain
Abbott
Nickelson Creek
Branch
MUDDY CREEK WILDLIFE MANAGEMENT AREA
Pond Ridge
Hickory Ridge
Windy Branch
Little
Nickelson
Branch
BOUNDARY
MANAGEMENT AREA


R. 33 W.
R. 32 W.
(Joins sheet 31)
T. 2 N.
T. 1 N.
OKLAHOMA
LE FLORE COUNTY
BOUNDARY
FOREST
NATIONAL
OUACHITA
NATIONAL
FOREST
Haus
Puryear
Cedar Cr.
Creek
Branch
Long
Black Fork
Black
Fork
Big
Creek
Price
Creek
Creek
Bayou
(Joins sheet 38)
(Joins inset, sheet 49)
N
1 MILE
1 KILOMETER
SCALE 1:20 000

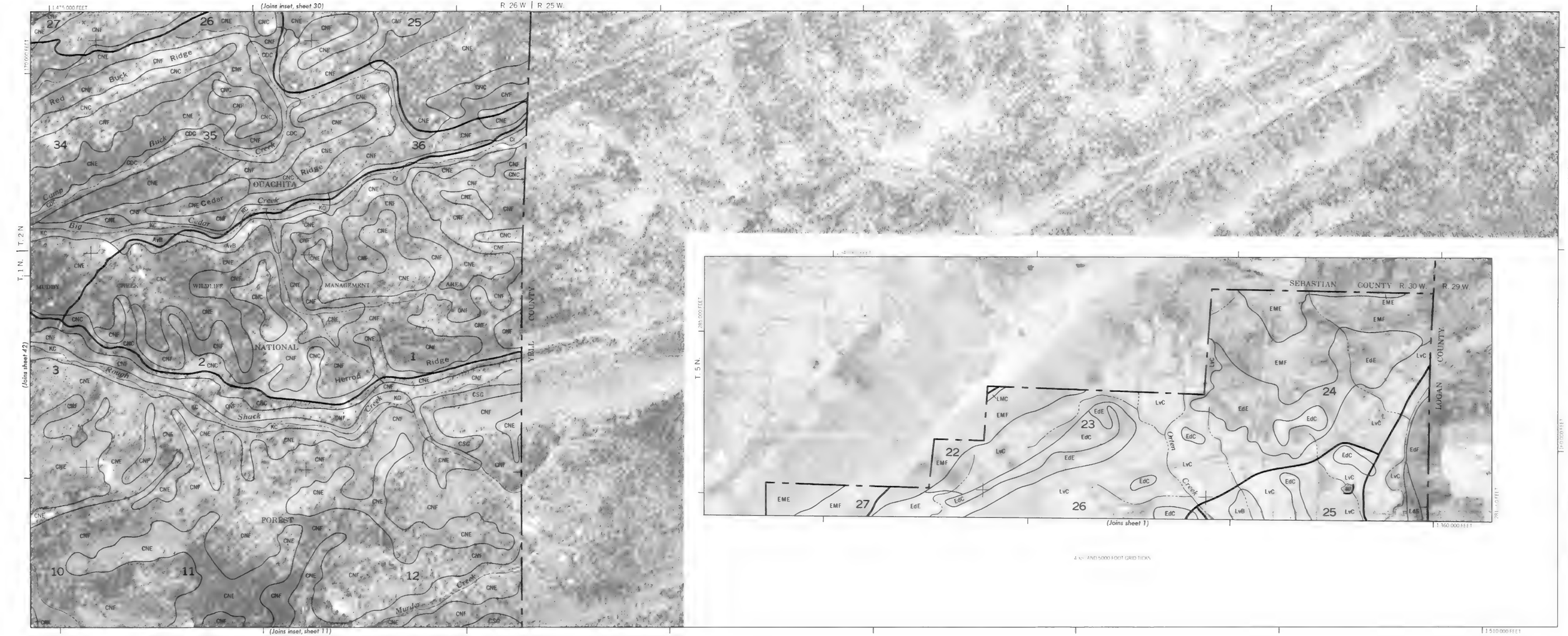

38
N
(Joins sheet 32)
R. 32 W.
R. 31 W.
T. 1 N.
T. 2 N.
Black Fork
HORSESHOE
MOUNTAIN
OUACHITA
NATIONAL
FOREST
Fork
Black
Dry Creek
Clear Fork
Tintop
(Joins sheet 37)
(Joins sheet 39)
(Joins sheet 44)
1 MILE
1 KILOMETER
SCALE 1:20 000
1 290 000 FEET
100 000 FEET


R. 31 W. | R. 30 W.
R. 30 W. | R. 29 W.
(Joins sheet 33)
T. 1 N. | T. 2 N.
(Joins sheet 38)
(Joins sheet 40)
(Joins sheet 45)
N
OUACHITA
NATIONAL
FOREST
Blansett
Ritz
Nella
FOURCHE LA FAVE
RIVER
Black Fork
Ray Branch
Henry Branch
Vestal Branch
Clear Creek
Heath Creek
Clear Fork
Dillard Branch
1 MILE
1 KILOMETER
SCALE 1:20 000
1 360 000 FEET

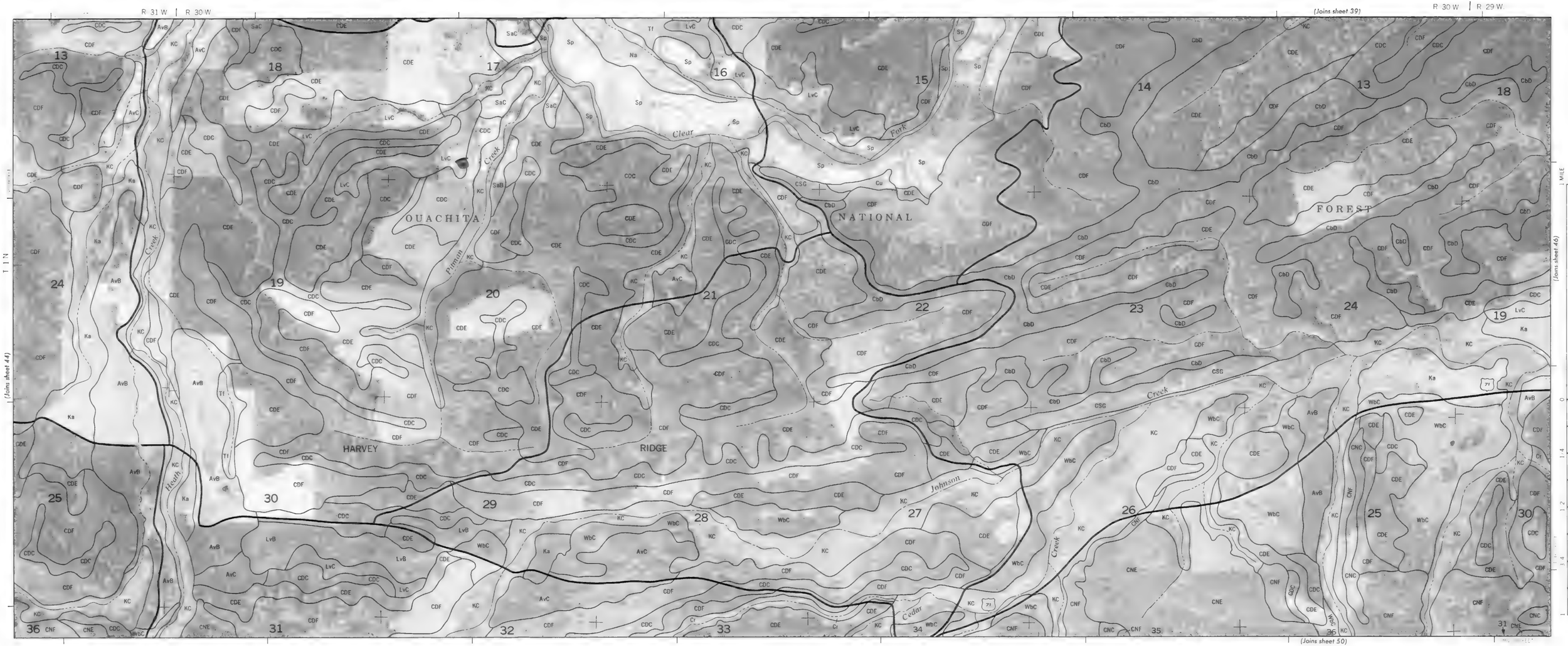

N
(Joins sheet 34)
R. 29 W. | R. 28 W.
T. 1 N. | T. 2 N.
(Joins sheet 39)
(Joins sheet 41)
(Joins sheet 46)
SCALE 1:20 000
1 MILE
1 KILOMETER
FOURCHE RIVER
LA FAVE RIVER
KEY MOUNTAIN
OUACHITA NATIONAL FOREST
Northern Creek
Stevens Creek
Session Branch
MILL CREEK MOUNTAIN
Boles
BOUNDARY

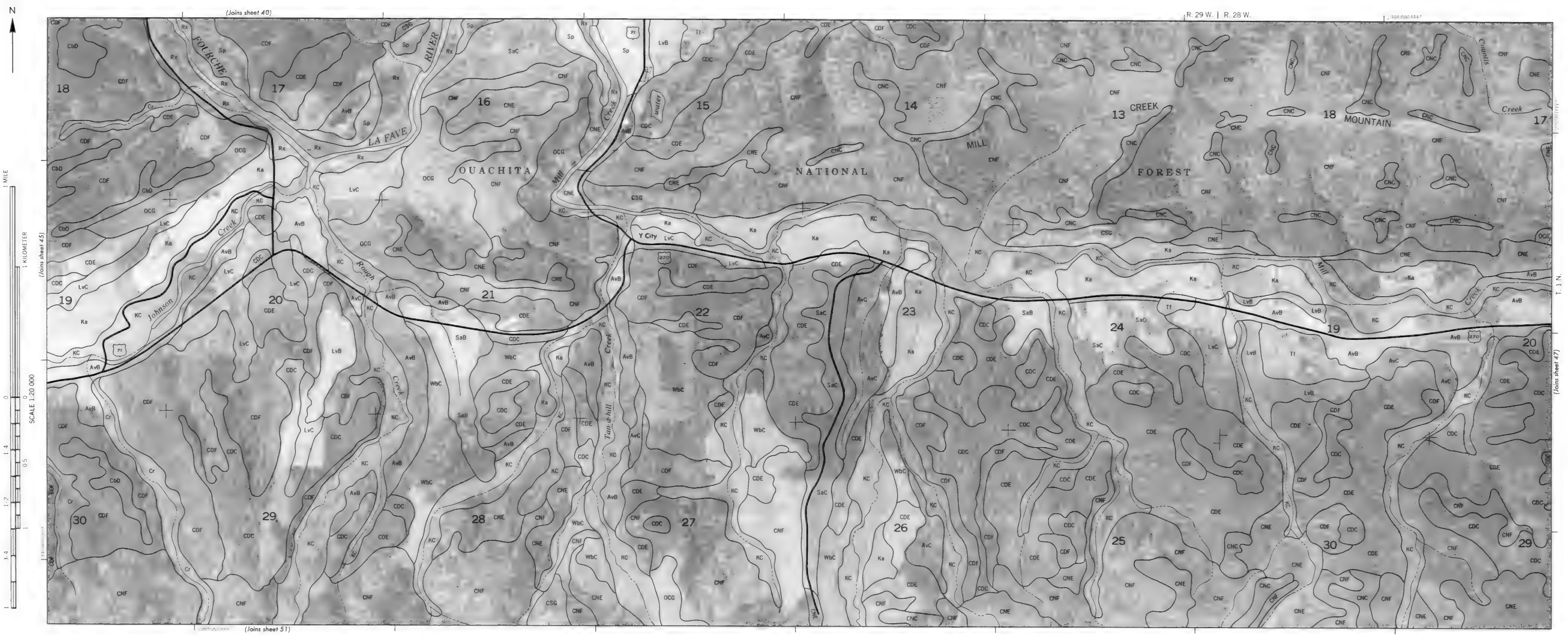

1 400 000 FEET
R. 28 W. | R. 27 W.
(Joins sheet 35)
(Joins sheet 40)
(Joins sheet 42)
(Joins sheet 47)
T 1 N | T 2 N
N
Fourche La Fave River
FOURCHE
LA FAVE
RIVER
OUACHITA NATIONAL FOREST BOUNDARY
MANAGEMENT AREA BOUNDARY
Huges Mountain
Huckleberry Mountain
OUACHITA
NATIONAL
FOREST
MUDDY CREEK WILDLIFE MANAGEMENT AREA
Creek
Haney
Turkey Creek
Robertson
Creek
Boston
Muddy Creek
Cove Creek
Cedar Creek
Little Flat Creek
Little
Road Ridge
Branch
1 MILE
1 KILOMETER
SCALE 1:20 000

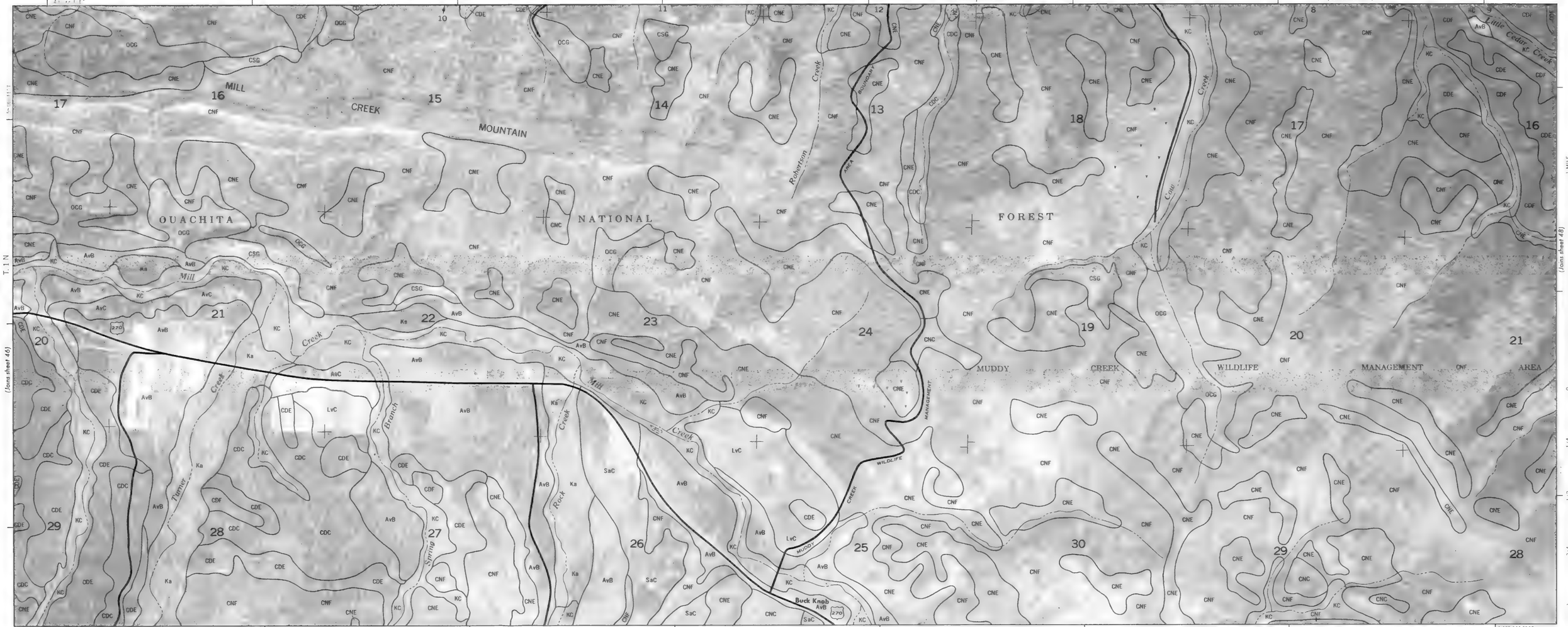
SOIL SURVEY OF SCOTT COUNTY, ARKANSAS - SHEET NUMBER 42


N
R. 26 W.
R. 25 W.
R. 30 W.
R. 29 W.
T. 1 N.
T. 2 N.
T. 5 N.
(Joins inset, sheet 30)
(Joins inset, sheet 42)
(Joins inset, sheet 11)
(Joins sheet 1)
YELL COUNTY
SEBASTIAN COUNTY
LOGAN COUNTY
OUACHITA NATIONAL FOREST
WILDLIFE MANAGEMENT AREA
Buck Ridge
Red Buck Creek Ridge
Camp Cr.
Big Cedar Creek
Cedar Creek
Rough Shack Creek
Herron Ridge
Murdo Creek
Oxley Creek
MUDDY CREEK
1 MILE
1 KILOMETER
SCALE 1:20 000
4 KM AND 5000 FOOT GRID TICKS


(44)
N
(Joins sheet 38)
R. 32 W.
R. 31 W.
HORSESHOE
MOUNTAIN
Saddle Gap
Price
Creek
OUACHITA
NATIONAL
FOREST
POLK COUNTY
POLK COUNTY
Clear
Fork
Salt
Terrapin
Creek
Creek
(Joins inset, sheet 49)
(Joins sheet 45)
(Joins sheet 49)
T. 1 N.
1 MILE
1 KILOMETER
SCALE 1:20 000
1 320 000 FEET


R 31 W
R 30 W
R 30 W
R 29 W
(Joins sheet 39)
(Joins sheet 44)
(Joins sheet 46)
(Joins sheet 50)
T 11 N
N
1 MILE
1 KILOMETER
SCALE 1:20 000
OUACHITA
NATIONAL
FOREST
HARVEY
RIDGE
Clear Fork
Creek
Pitman Creek
Heath Creek
Johnson Creek
Cedar Creek
71


N
(Joins sheet 40)
R. 29 W. | R. 28 W.
(Joins sheet 45)
(Joins sheet 47)
(Joins sheet 51)
T. 1 N.
1 MILE
1 KILOMETER
SCALE 1:20 000
OUACHITA
NATIONAL
FOREST
FOURCHE
LA FAVE
RIVER
Johnson
Creek
Rough
Mill
Creek
Tan-a-hill
Creek
MILL
CREEK
MOUNTAIN
Y City
71
270


R. 28 W.
R. 27 W.
(Joins sheet 41)
T. 1 N.
(Joins sheet 46)
(Joins sheet 48)
(Joins sheet 52)
OUACHITA NATIONAL FOREST
MUDDY CREEK WILDLIFE MANAGEMENT AREA
MILL CREEK
MOUNTAIN
Robertson Creek
Little Cedar Creek
Mill Creek
Turner Creek
Rock Creek
Spring Creek
Muddy Creek
Buck Knob
N
1 MILE
1 KILOMETER
SCALE 1:20 000


N
(Joins sheet 42)
R. 27 W.
R. 26 W.
1 470 000 FEET
T 1 N
(Joins inset, sheet 11)
(Joins sheet 47)
(Joins inset, sheet 18)
1 MILE
1 KILOMETER
SCALE 1:20 000
OUACHITA
NATIONAL
FOREST
MUDDY
CREEK
WILDLIFE
MANAGEMENT
AREA
MOUNTAIN
MILL
CREEK
MONTGOMERY
COUNTY
MONTGOMERY
COUNTY
Big
Cedar
Creek
Little
Fork
West
Fork
Ringer
Branch
Wolf Divide
Creek
Little
Creek
Athen
Creek
Creek
9
10
11
12
13
14
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16
18
17
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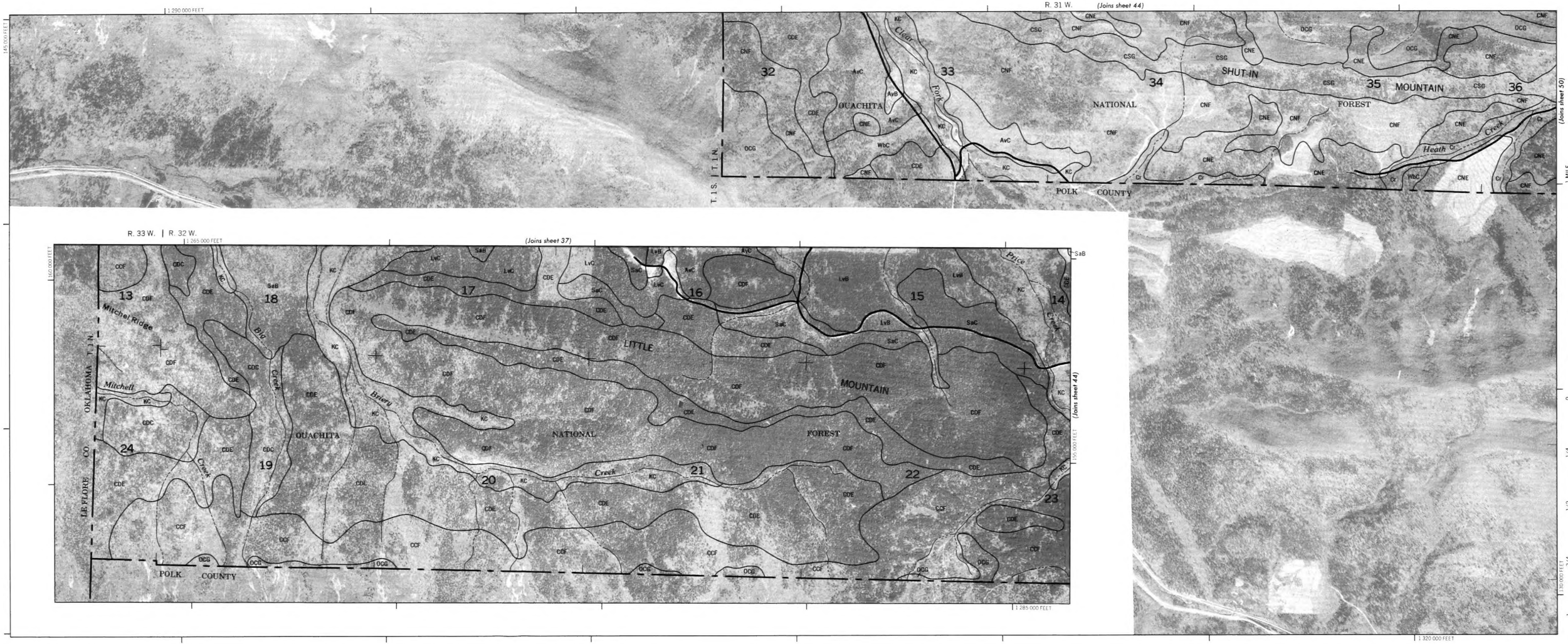
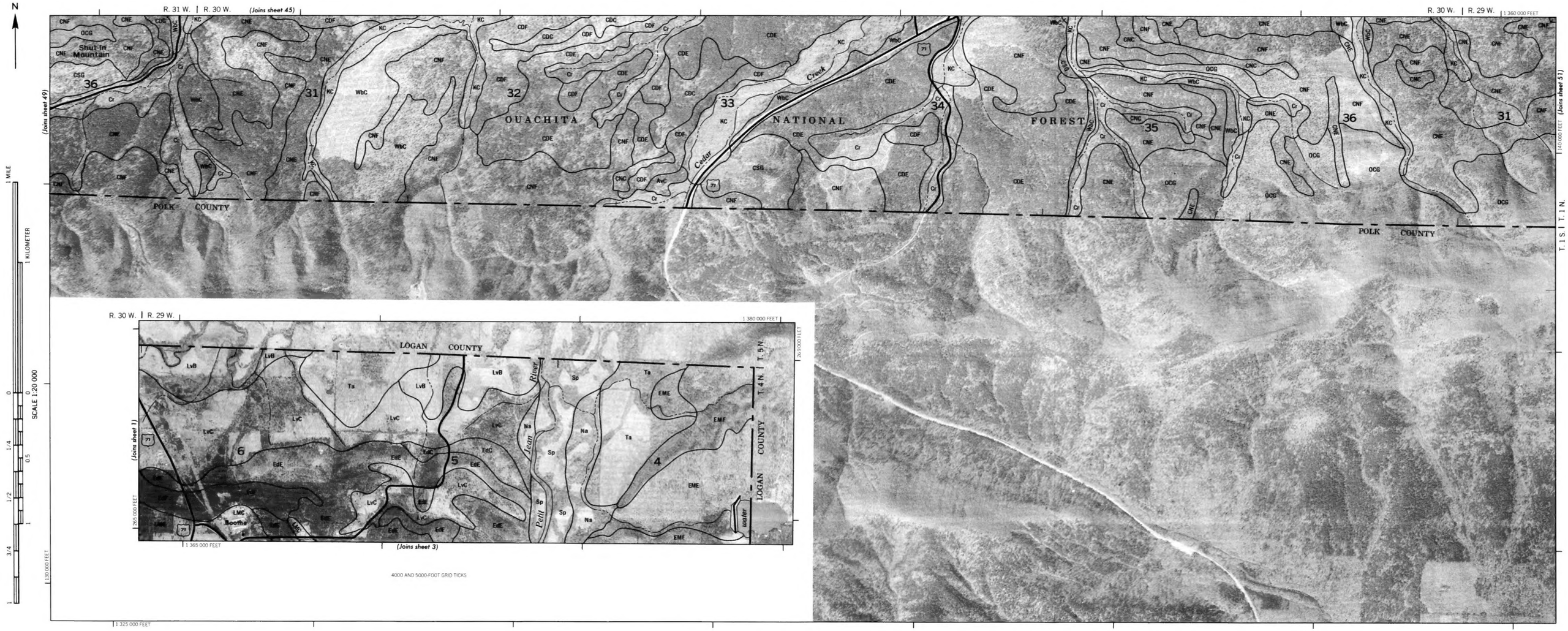
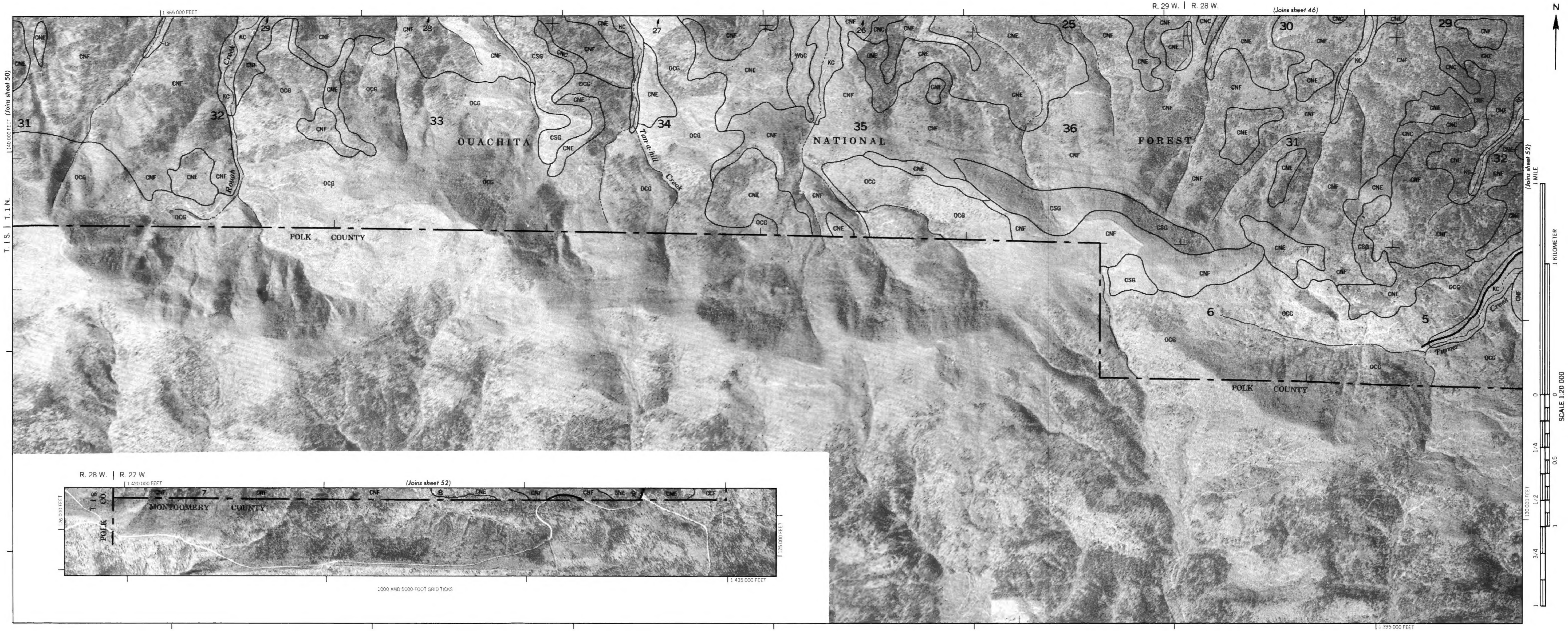
19
20
27
26
25
28


N
1 290 000 FEET
R. 31 W.
(Joins sheet 44)
R. 33 W.
R. 32 W.
1 265 000 FEET
(Joins sheet 37)
1 285 000 FEET
1 320 000 FEET
(Joins sheet 50)
(Joins sheet 44)
T. 1 N.
T. 1 S.
OKLAHOMA
LE FLORE CO
POLK COUNTY
OUACHITA NATIONAL FOREST
SHUT IN MOUNTAIN
LITTLE MOUNTAIN
Clear Fork
Mitchell Ridge
Big Creek
Briery Creek
Price Creek
Heath Creek
Mitchell
1 MILE
1 KILOMETER
SCALE 1:20 000


50
N
R. 31 W. | R. 30 W.
(Joins sheet 45)
R. 30 W. | R. 29 W.
1 360 000 FEET
(Joins sheet 49)
(Joins sheet 51)
Shut-In Mountain
OUACHITA
NATIONAL
FOREST
Cedar Creek
POLK COUNTY
POLK COUNTY
T. 1 S., T. 1 N.
R. 30 W. | R. 29 W.
1 380 000 FEET
LOGAN COUNTY
(Joins sheet 1)
Petit Jean River
T. 5 N.
T. 4 N.
LOGAN COUNTY
water
Boone
1 365 000 FEET
(Joins sheet 3)
265 000 FEET
260 000 FEET
1 325 000 FEET
4000 AND 5000-FOOT GRID TICKS
1 MILE
1 KILOMETER
SCALE 1:20 000
1/4
0.5
1/2
1
3/4
1 320 000 FEET


51
N
R. 29 W. | R. 28 W.
(Joins sheet 46)
(Joins sheet 50)
(Joins sheet 52)
1 365 000 FEET
140 000 FEET
T. 1 N.
T. 1 S.
OUACHITA
NATIONAL
FOREST
POLK COUNTY
POLK COUNTY
Rough Creek
Tan-a-hill Creek
Turner Creek
CNF
CNE
CNC
OCG
CSG
KC
WbC
25
26
27
28
29
30
31
32
33
34
35
36
5
6
R. 28 W. | R. 27 W.
1 420 000 FEET
(Joins sheet 52)
MONTGOMERY COUNTY
POLK CO.
T. 1 S.
126 000 FEET
125 000 FEET
1 435 000 FEET
7
8
9
1000 AND 5000-FOOT GRID TICKS
1 395 000 FEET
130 000 FEET
1 MILE
1 KILOMETER
SCALE 1:20 000
0
1/4
1/2
3/4
1
0.5


N
(Joins sheet 47)
R. 28 W.
R. 27 W.
1 435 000 FEET
(Joins sheet 51)
(Joins inset, sheet 18)
T. 1 S.
T. 1 N.
1 MILE
1 KILOMETER
SCALE 1:20 000
1 400 000 FEET
(Joins inset, sheet 51)
OUACHITA
NATIONAL
FOREST
MANAGEMENT
AREA
WILDLIFE
MUDDY
CREEK
Buck Knob
Turner Creek
Rock Creek
Spring Branch
Mill Creek
POLK COUNTY
MONTGOMERY COUNTY
BOUNDARY